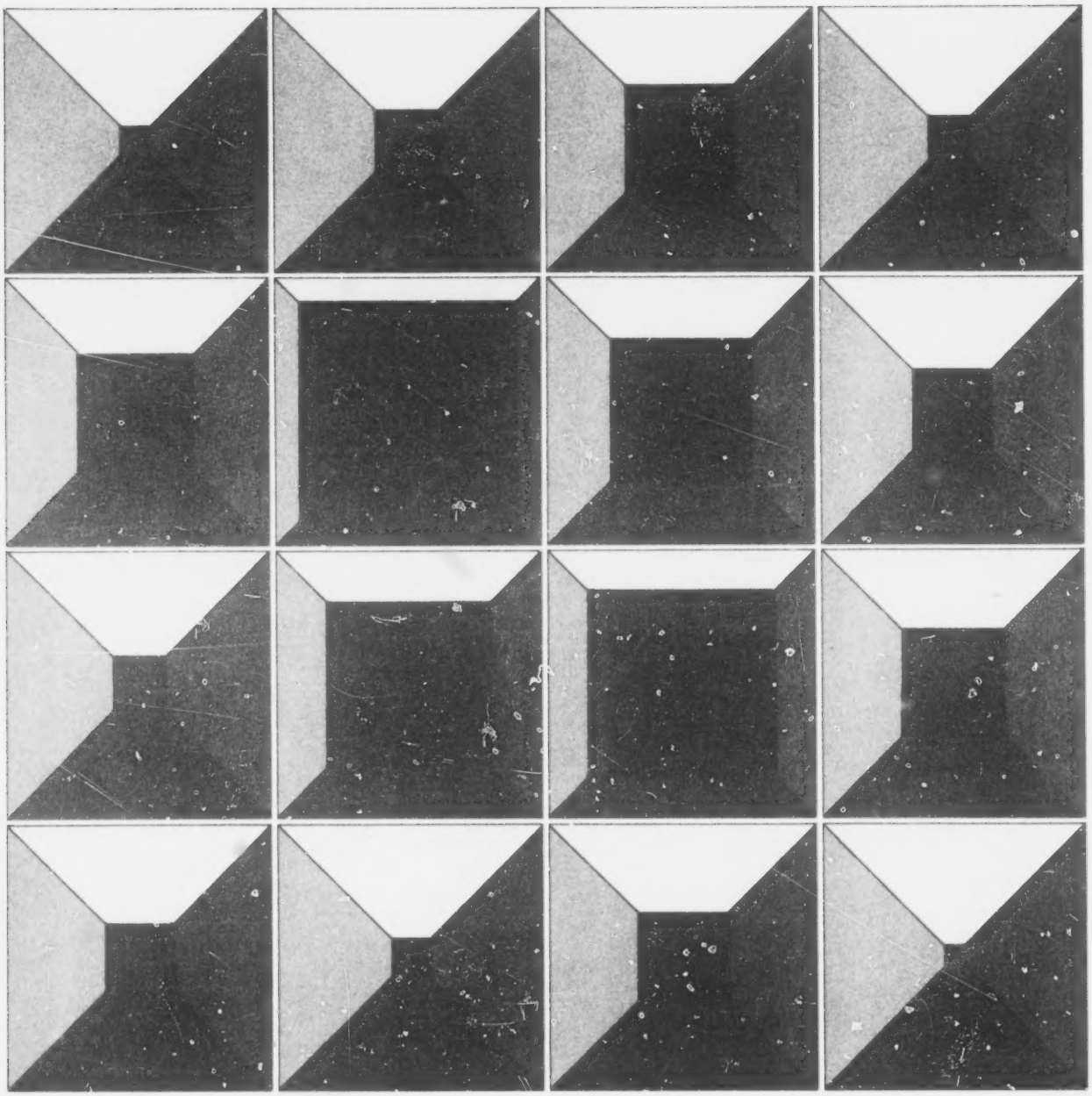
A CBO Study

U.S. Shipping and Shipbuilding: Trends and Policy Choices

August 1984

Congress of the United States
Congressional Budget Office



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U.S. SHIPPING AND SHIPBUILDING:

TRENDS AND POLICY CHOICES

The Congress of the United States
Congressional Budget Office

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PREFACE

As the Congress considers the many issues bearing on U.S. national security, one of the more difficult matters will be what, if anything, should be done to assist the economically troubled U.S. shipping and shipbuilding industries. Without government assistance or other reform, these industries--long considered important to the economic and security interests of the United States--may shrink because of slack market conditions and lower-cost foreign competition. This shrinkage may ultimately impair the ability of the United States to mobilize, deploy, and support its forces in war.

This report, prepared at the request of the Senate Committee on Armed Services, reviews the background and current status of the maritime industries and U.S. maritime policy. It suggests policy options for providing further support and assesses the probable budgetary and/or economic impact of these options. In accordance with CBO's mandate to provide objective and impartial analysis, this study makes no recommendations.

Peter T. Tarpgaard of CBO's National Security Division prepared this study under the general supervision of Robert F. Hale. Richard Mudge, Lawrence Forest, John Mayer, Philip Webre, and Nora Slatkin of the CBO staff made valuable contributions to the analysis as did James Sherman during his service as a CBO intern. The author gratefully acknowledges the helpful comments of Alfred Fitt, Robert Hartman, and Richard Mudge of the CBO staff and the comments and support of John Hamre, formerly of the CBO staff. The author is also indebted to Professor Henry S. Marcus of the Massachusetts Institute of Technology for his counsel during the research and for reviewing the draft of the report. (The assistance of external reviewers implies no responsibility for the final product, which rests solely with CBO.) V. Lane Pierrot of CBO rendered invaluable assistance during the final stages of preparing the report. Patricia H. Johnston edited the manuscript, assisted by Nancy H. Brooks. G. William Darr prepared the manuscript for publication.

Rudolph G. Penner
Director

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SUMMARY

Shipping and shipbuilding have been important factors in the American economy since early colonial times. Government support of maritime affairs, which also began in the pre-Revolutionary era, has been motivated by two mutually reinforcing concerns: comercial advantage and national security. Throughout this long history, America's maritime industries have experienced periods of both great expansion and severe contraction. Today, these industries are once again in decline.

Although the United States now has the world's largest volume of international trade, less than 6 percent of this trade (by weight) is carried on U.S.-flag ships because foreign ships are able to offer significantly cheaper service. With nearly all U.S. allies overseas and a military strategy of forward defense, sealift is clearly an issue of major importance for U.S. national security. The health of the U.S. merchant marine and the shipbuilding industry that supports it is, therefore, a matter of continuing concern for U.S. policymakers.

Current maritime support programs now cost nearly $1 billion annually. Recent studies by the Department of Defense and by the Navy and Maritime Administration indicate, however, that the United States is unlikely, given present trends in the maritime industries, to have sealift and shipyard capabilities that would be prudent for future wartime contingencies. To improve U.S. maritime capabilities, this report presents three basic options. These options are centered on the three fundamental maritime support mechanisms which are:

- To provide subsidies through direct payments and/or indirect tax and financing support,
- To reserve certain cargoes for U.S.-flag ships, and
- To procure and operate shipping through direct government purchase.

The budgetary or economic costs of these options range from $1.0 billion to $4.0 billion per year above current costs. Less costly, but probably less effective, variants of the three basic options are also considered.

MARITIME POLICY OBJECTIVES

The United States has a clearly defined maritime policy enunciated in the Merchant Marine Act of 1920:

> . . . That it is necessary for the national defense and for the proper growth of its foreign and domestic commerce that the United States shall have a merchant marine of the best equipped and most suitable types of vessels sufficient to carry the greater portion of its commerce and serve as a naval or military auxiliary in time of war or national emergency, ultimately to be owned and operated privately by citizens of the United States; and it is hereby declared to be the policy of the United States to do whatever may be necessary to develop and encourage the maintenance of such a merchant marine, . . .

This policy statement (modified in 1936 to a "substantial portion" rather than the "greater portion of its commerce") remains the officially stated objective of U.S. maritime policy to this day. It rests on two basic objectives--commercial advantage and military support--that have long motivated maritime policy in many countries throughout history.

The Commercial Advantage Objective

The notion that a large national-flag merchant fleet provides an important commercial advantage has a long history and many adherents; it seems doubtful today, however, that the cost of supporting the U.S.-flag merchant marine could be justified solely by commercial considerations. Since the articulation of U.S. maritime policy in the Merchant Marine Act of 1920, the share of commercial cargo carried in U.S.-flag ships has steadily declined, interrupted only by the massive build-up in U.S. shipping in World War II (see the Summary Figure). Among the many reasons for this trend, the most important is persistently higher U.S. operating costs (typically 50 percent more) than competing foreign ship operators. The substantial gap in costs between U.S. and foreign operators must be filled by some kind of subsidy or cargo reservation program for the U.S. operators to survive. The costs of these programs are borne either by taxpayers or by the economy through higher prices arising from increased shipping costs. These expenses certainly raise doubts about the commercial advantage of supporting a high-cost merchant marine.

Summary Figure.

U.S.-Flag Ship Participation in U.S. Oceanborne Foreign Trade, 1920-1980

SOURCE: Congressional Budget Office.

The National Security Objective

The other historic rationale for a supportive national maritime policy --national security--is more compelling. Whatever may be the commercial disadvantages, the United States continues to have strong incentives to maintain a national fleet of merchant ships. Sealift, the carrying of people and material overseas on ships, is a fundamental requirement of U.S. military strategy.

Nearly all U.S. allies are overseas and, in keeping with the military forward defense strategy, about one-fourth of U.S. land combat power--six Army divisions and one Marine Amphibious Force (MAF)--is stationed overseas. In time of war, these forces and U.S. support of allies overseas would be sustained by sealift. In addition, the three-fourths of U.S. ground combat power stationed in the continental United States--eleven active and seven reserve Army divisions and two active and one reserve Marine Amphibious Force--would have to be transported to the combat areas. Ships would carry the bulk of these forces, their equipment, and resupplies as the war continued. Ninety-five percent of the dry bulk material and over 99 percent of all petroleum products would be transported by sealift.

In a very real sense, the billions of dollars that the United States spends each year on general purpose combat and support forces are predicated upon the presumption that these forces can be transported into combat. This supposition, in turn, presumes the availability of sealift. Sealift, therefore, is a fundamental part of the U.S. national security posture.

U.S.-Flag and Foreign Shipping Roles

Even a major trading nation, such as the United States, might very well depend on foreign shipping to carry all of its imports and exports in peacetime, but relying on foreign-flag ships for wartime service seems a much riskier proposition, especially for direct support of military operations. The United States now depends on foreign-flag shipping for about 94 percent (by weight) of its oceanborne commerce. Although it might be desirable to have enough U.S.-flag shipping to sustain normal trade in wartime, achieving this goal is probably not realistic. What is more achievable--and more important--is assuring enough U.S.-flag ships with American crews to undertake direct military support functions. While it is conceivable that the United States could charter foreign-flag ships for these functions, wartime operations would probably involve considerable hazards and it would clearly be risky to depend on foreign shipowners or foreign crews for operations vital to a U.S. war effort. The United States, there-

fore, needs a certain number of cargo ships, owned and crewed by Americans, that would be available and suitable to support military operations.

NATIONAL SECURITY REQUIREMENTS

The Department of Defense (DoD) and the Navy and Maritime Administration have produced two recent studies that evaluate U.S. shipping and U.S. shipbuilding capabilities, respectively, vis-a-vis current military contingency planning. The studies concluded that, in the event of a national emergency, some future shortfalls could exist in the ability of the U.S.-flag cargo fleet to deploy military forces overseas and in the ability of the shipbuilding industrial base to mobilize promptly for war.

Shipping

In the recent DoD Sealift Study, the department estimated U.S. sealift requirements in wartime. While the details are classified, the study concluded that the U.S.-flag dry cargo fleet projected for 1988 would be about 10 percent below U.S. needs in a major war with the Soviet Union. More recent projections by the Navy and Maritime Administration indicate that a still greater shortfall of about 25 percent would exist in 1988, despite current DoD programs to improve the military usefulness of the U.S.-flag fleet.

The current fleet consists of about 790 ships, both active and inactive, under U.S. registry. But the Navy deems that only about 620 of these ships are militarily useful. Indeed, there is a growing dichotomy between those features that produce a commercially efficient ship and those that yield ships more useful for support of military operations. In general, the most militarily useful ships tend to be:

- Relatively small--able to go in and out of shallow or otherwise restricted waters;
- Flexible--able to carry a variety of cargoes; and
- Self-sustaining--able to load and off-load cargo without specialized shore facilities.

Unfortunately, these characteristics are at odds with those of the most efficient commercial ships, which tend to be large, specialized, and dependent on port facilities for efficient loading and offloading. This dif-

ference in the qualities that provide military utility as opposed to those that produce commercial efficiency leads to some fundamental difficulties in developing an effective national maritime policy.

Shipbuilding

Problems affecting the domestic shipbuilding industry are similar to those for shipping. The domestic shipbuilding market has collapsed in recent years. Since August 1982, U.S. shipyards have received no new orders for commercial oceangoing ships; only the Navy has provided new work. A worldwide depression in the shipping industry contributed to the collapse but, even if worldwide demand for ships revives, U.S. shipyards would be unable to match or even approach the prices offered by most foreign shipbuilders. For a number of reasons, including lower wages, more efficient building methods, and the strength of the dollar relative to foreign currencies, prices of cargo ships built in Japan or Korea range as low as one-third of the prices of the same ships built in U.S. yards.

Although reliance on foreign shipbuilders may be acceptable in peacetime, a domestic shipbuilding industry is vital to support the Navy and the U.S. merchant fleet in wartime. Wartime shipyard tasks include reactivation of reserve fleets, accelerated construction and repair activities, and battle damage repair, functions that would be important for a broad spectrum of military contingencies. The current U.S. shipbuilding industry--which is largely sustained by U.S. Navy business--may not be adequate for wartime mobilization if recent projections of shipyard employment trends are borne out. Using the same wartime planning scenarios examined by the DoD Sealift Study, a Navy/Maritime Administration analysis--the Shipyard Mobilization Base Study (SYMBA)--concluded that the U.S. shipbuilding industry would need to increase its trained work force about 30 percent above that projected for 1988 to meet wartime needs in the first few months of a major conflict. Some additional market stimulation or support by the government would probably be required to reach that level.

Specific Shipbuilding Goals

CBO cannot assess the correctness of these various studies since they depend on military judgment and the details of possible future wars. Ultimately, though, broad policy goals must focus on specifics--in this case, what level of shipbuilding activity is necessary to support U.S. needs? As identified in the DoD sealift and the SYMBA studies, a reasonable goal to maintain both adequate sealift and shipbuilding capacity might be construction of about 20 cargo ships annually in U.S. shipyards. This construction, together with expected naval construction and overhaul work,

should sustain the shipbuilding industrial capacity that the SYMBA study suggests would be needed for wartime mobilization and fleet support. The additional 20 ships, if they were militarily useful, would sustain a sealift fleet of about today's size (600 ships) assuming that each ship could be kept in service for about 30 years. Needless to say, any specific estimate of national security requirements for shipping and shipbuilding is highly uncertain because it depends on the details of a future war, but this number suggests one possible, reasonable estimate. Higher or lower goals could also be established that would impose different levels of risk in meeting wartime sealift and mobilization needs.

CURRENT MARITIME POLICIES

In order to meet national security requirements, governments can support their national fleets in three fundamental ways:

- Subsidies, which can be either direct payments to ship operators and builders or indirect subsidies such as tax incentives and financing mechanisms;
- Cargo reservation, which requires that certain cargoes be carried by national merchant fleets; or
- Direct government procurement and operation of cargo shipping.

Past Administrations have used all three methods to support American shipping and shipbuilding. The current Administration has, however, moved away from direct subsidies. It has cancelled the construction differential subsidies (CDS) paid to shipbuilders for new ships built in the United States. It has also indicated that only existing contracts providing operating differential subsidies (ODS) for U.S.-flag ships will be paid; no new ones will be established. The Administration has asked for legislation that would provide some new assistance to ship operators, but the proposed legislation would not provide any new aid to U.S. shipbuilders.

The Administration is also moving to enhance the military usefulness of the current U.S.-flag cargo fleet by procuring "sea sheds" and "flat racks" (devices that improve a containership's ability to carry military equipment). It is also purchasing militarily useful ships that might otherwise be retired and placing them in the government's Ready Reserve Fleet.

These Administration initiatives should avoid increasing maritime support costs, but probably would not induce additional commercial ship construction at U.S. shipyards. Moreover, they might not result in more ships being operated by U.S. crews under the U.S. flag, since no new operating

TABLE S-1. BASIC MARITIME POLICY OPTIONS

Option	Estimated Average Annual Cost	Where Do Costs Appear	Commercial Efficiency of Ships	Military Usefulness of Ships	Peacetime U.S.-Flag Ship Activity
Option I--Subsidies: Use CDS and ODS to produce 20 ships per year. a/	$1.0-1.5 billion	Department of Transportation budget	High	Low	Higher
Option II--Cargo Preference: Boggs bill approach. Induce commercial orders for about 20 ships per year. b/	$3.0-4.0 billion	Off-budget, impact on shippers	High	Low	Higher

(Continued)

a. This option would use higher funding for construction differential subsidies (CDS) and operating differential subsidies (ODS), as authorized in current law, to induce the building in U.S. shipyards and operating under U.S. registry of an average of 20 new oceangoing ships per year.

b. This option, modeled on the bill introduced by Representative Lindy Boggs (H.R. 1242), would require that a specified portion of all bulk

differential subsidy contracts are being let, and operating costs would still be higher for U.S.-manned ships even when using cheaper, foreign-built ships.

In order to maintain the sealift and shipbuilding industrial capability that recent Administration studies have indicated are needed for wartime mobilization, the Congress may wish to consider alternative approaches to maritime support.

TABLE S-1. (Continued)

Option	Estimated Average Annual Cost	Where Do Costs Appear	Commercial Efficiency of Ships	Military Usefulness of Ships	Peacetime U.S.-Flag Ship Activity
Option III--Direct Government Procurement: Procure 20 ships per year, operate in MSC, lease out, or assign to Ready Reserve Fleet (RRF). c/	$1.5-2.0 billion	Defense budget	Low	High	Moderately higher

SOURCE: Congressional Budget Office.

cargoes carried between U.S. and foreign ports be carried in U.S.-built, U.S.-flag ships. The specified portion in H.R. 1242 is initially 5 percent, rising by 1 percent each year until it levels off at 20 percent. It is estimated that the demand for new ships resulting from this legislation would be about 20 ships per year.

c. In this option, the government would contract directly with U.S. shipbuilders for production of 20 ships per year built to designs specified by the government. Authority for this is already contained in Title VII of the Merchant Marine Act of 1936. Ships would then be leased, if possible, to private operators, operated by the Military Sealift Command (MSC), or placed in the Ready Reserve Fleet.

ALTERNATIVE APPROACHES

Basic Policy Options

Three maritime policy options are summaized in Table S-1. Each relies upon one of the three basic approaches: subsidies, cargo reservation, or direct procurement. Each of the options should induce construction of

about 20 cargo ships annually in U.S. yards that would then be operated in the U.S.-flag fleet. Significantly, the production of 20 ships annually should maintain, over the long term, the sealift and shipyard capacity requirements identified in the recent studies cited earlier. Higher or lower goals could be set with costs scaled accordingly.

All options involve significant costs--no way has been found to create a larger merchant marine or shipbuilding demand without an economic effect. Each option would add at least $1 billion a year to current maritime annual support costs of nearly $1 billion. Costs could be higher, especially for options using cargo reservation to stimulate shipping and shipbuilding, since the economic impact of this approach is quite uncertain.

The options would have generally similar effects on the numbers of ships built and operated in the United States. An additional 20 ships built annually in U.S. yards should maintain a shipbuilding capacity of about the size required for wartime mobilization and the annual infusion of that many new ships should maintain a U.S.-flag cargo fleet of roughly today's size.

The basic options differ most sharply in the military usefulness of the ships they would produce. The subsidy and cargo preference programs would create incentives for commercial efficiency. Subsidies are minimized and profits are maximized when commercial efficiency is stressed. Thus the tendency, both in government and in industry, would be to favor commercially efficient ship designs over the less efficient, but more militarily useful designs, when subsidies or cargo preference are the means of stimulating maritime enterprise. Direct procurement--which achieved dramatic results in World Wars I and II--seems most likely to produce the kinds of ships that would be useful in wartime, and, looking to the future, the kinds of ships that could be readily adapted to a broadening range of combat support missions.

Illustrative Variants of the Options

Variants of the basic options outlined above could include not only establishing them at higher or lower cost levels but also varying other provisions of the options. Illustrative variants of the basic options are displayed in Table S-2.

These variants are less costly than the basic options but are also less beneficial, particularly for sustaining the shipbuilding industrial base. They include procurement of ships on the open market rather than through new construction in U.S. shipyards (Options V-1 and V-2) and a combination of measures (Option V-3). The number of possible variants is endless but all

would be derivatives of or combinations of one or more of the basic approaches--direct and indirect subsidies, cargo preference, or direct government procurement.

Selection Among the Options

Selection among these policy options should probably be governed by the weighing of basic objectives, especially commercial efficiency or military utility. With the possible exception of the economic impact of the cargo preference option, the differences in cost estimates are probably not sufficiently large, given inherent uncertainties, to be decisive even if cost were the prime criterion in selection. Instead, the choice may rest mainly on policy objectives. If the key policy objective is the maintenance of shipping and shipbuilding capacity adequate for national security, direct procurement would guarantee ships that would be militarily useful. If the key policy objective is, rather, to maintain more peacetime shipping for the U.S.-flag fleet, then cargo preference or direct subsidies would offer advantages.

TABLE S-2. ILLUSTRATIVE VARIANTS OF BASIC POLICY ALTERNATIVES

Option Variants	Estimated Annual Cost	Where Costs Appear	Emphasize Commercial or Military Utility	Shipbuilding Industry Effects	Merchant Marine Effect
Option V-1: Procure ships on open market, lease out or assign to RRF 20 ships/year a/	$30-300 million	DoD budget	Military	Modest, conversion work only	Moderately positive
Option V-2: Build in U.S. and procure on open market, half and half, 20 ships/year b/	$900-1,200 million	DoD budget	Military	Positive	Moderately positive
Option V-3: Administration program plus CDS plus open market procurement c/	$500-700 million	DoD and DOT budget	Commercial and military	Positive	Positive

SOURCE: Congressional Budget Office.

a. In this option the goverment would procure 20 ships per year as in Option III, but would buy used ships on the open market rather than having new ships built in U.S. shipyards. This would lower the cost of acquiring sealift assets, but would also reduce the work available for maintaining shipyard capacity.

TABLE S-2. (Continued)

b. In this option, a compromise between Option III and Option V-1, the government would procure 20 ships per year, half newly constructed in U.S. shipyards and half used ships on the open market. This would lower the cost of acquiring sealift assets, as compared with Option III, but would provide more work for the industrial base than Option V-1.

c. This option illustrates how several approaches could be blended to serve the divergent interests of ship operators, shipbuilders, and military planners. It would reduce disincentives for procuring ships abroad by ship operators, reestablish funding for construction differential subsidy to assist shipbuilders, and procure militarily useful ships on the open market to build up sealift reserves.

CHAPTER I. INTRODUCTION

The United States relies on ocean transportation to support its economy in peace and to support its military operations in war. Sealift--the transport of military forces and material overseas on ships--is a fundamental requirement of U.S. military strategy, with all U.S. contingency plans assuming that adequate and reliable sealift will be available when needed.

Nearly all American allies are overseas and, in keeping with the U.S. forward defense strategy, about one-fourth of U.S. land combat power, six Army divisions and one Marine Amphibious Force, is stationed overseas. In time of war, these forces and U.S. support of its allies overseas would be sustained by sealift. In addition, the three-fourths of U.S. ground combat power stationed in the continental United States--eleven active and seven reserve Army divisions and two active and one reserve Marine Amphibious Force--would have to be moved to the combat areas. Ships would provide the bulk of this transport. Sealift would carry 95 percent of the dry cargo material and over 99 percent of all petroleum products. 1/

In a very real sense, the billions of dollars that are spent each year on general purpose combat and support forces are predicated on the presumption that they can be transported into combat and that, in turn, assumes the availability of sealift. Sealift, therefore, is an integral part of America's national security posture.

Sea transportation is also vital to the national economy. The economy could not function without the raw materials brought in on ships and without the trade that is an important and growing component of national economic activity. U.S. trading volume is easily the largest in the world, totaling about $470.4 billion in 1983, an amount that exceeded that of Japan and the United Kingdom combined. The volume of trade as a percent of the gross national product (GNP) grew rapidly in the 1970s. Between 1970 and 1980, trade grew from 8.6 percent of GNP to 18.2 percent. Although trade fell back to 14.2 percent of GNP between 1980 and 1983, it continues to represent a substantial portion of U.S. economic activity and will probably resume its growth in the future.

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1. Testimony of Vice Admiral (VADM) Kent J. Carroll, USN, Commander, Military Sealift Command, before the Subcommittee on Seapower and Strategic and Critical Materials of the House Armed Services Committee, 98:1 (April 5, 1983).

MARITIME POLICY CONSIDERATIONS

Throughout history, trading nations have consistently felt that a merchant fleet was important to their economic well-being and have enacted various measures to encourage national merchant marines. These have included subsidies, cargo preference schemes, tax advantages, low-interest loans and loan guarantees, as well as laws reserving certain subsidies and cargoes to domestically constructed ships. Such support has a long history in the United States. Among the first acts of the First Congress were laws that established lower duties on cargoes carried on ships owned by U.S. citizens and that imposed higher duties on foreign ships entering U.S. ports. The First Congress also enacted legislation to provide for the registry of U.S.-flag shipping, which included the important stipulation that U.S.-flag ships must be constructed in American shipyards, a major stimulus to the new nation's infant shipbuilding industry.

Laws supporting a merchant fleet logically derive from a desire, either explicit or implied, on the part of legislators to promote national sea power. The term "sea power" is used here not in the narrow sense of just naval force, but rather in the broader context of all uses of the oceans for national commercial and political advantage. 2/

Thus a combination of mercantilist and security considerations motivated the enactment, over the years, of laws that benefited domestic ship-operating and shipbuilding industries. Such concessions came grudgingly against the basic free trade instincts of American culture. The same mercantilist and security considerations have motivated other nations as well, with the result that almost all trading nations have enacted measures to

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2. William Rietzel, in discussing Alfred Thayer Mahan's writings on sea power, described this view very effectively. He wrote, "In Mahan's view, a maritime power system was an integrated whole, working to forward a nation's position in the world. It worked as a stimulus to a nation's total capacity to produce, to distribute, and to influence in its favor the trend of international life. It used its seapower component--its overall maritime force--offensively in commercial competition. It used its seaforce component--its Navy--defensively in a world of incipient conflict. Mahan's consistent reminder was that he was talking of a tightly knit system of institutions, facilities, commercial carriers, and naval fleets and that no one of these elements of the system could be allowed to become inadequate without the system losing its effectiveness." William Reitzel, "Mahan on the Use of the Sea," Naval War College Review, vol. XXV, no. 5 (May-June 1973), pp. 73-82.

promote and protect their shipping and shipbuilding industries from foreign competition. Whatever the theoretical benefits of free trade may be, the reality is, and is likely to remain, world shipping and shipbuilding markets replete with restrictions and subsidies.

U.S. SHIPPING AND SHIPBUILDING TODAY

In these world markets, the U.S.-flag shipping and shipbuilding industries have not fared well in recent years. The United States emerged from World War II as the world's dominant economic and maritime power. Thanks to the incredible performance of the U.S. shipbuilding industry, which produced nearly 5,000 merchant ships during the war years, the U.S. merchant fleet exceeded that of all other nations combined at the end of the war. Since that time, the U.S. merchant fleet has steadily declined, as foreign competition offered cheaper ships and lower cargo rates. By 1983, U.S.-flag ships carried only 5.8 percent by weight (16.2 percent by value) of U.S. oceanborne foreign trade and the size of the fleet had fallen to 573 privately owned ships, ranking eleventh in the world in terms of fleet size (eighth in the world by lift capacity). The shipbuilding industry, which mobilized to produce an average of over 1,200 merchant ships annually in World War II, received orders for only seven commercial ships in 1980, nine in 1981, three in 1982, and none in 1983. Clearly, the American maritime industries have fallen on hard times.

The implications of this decline for military operations are illustrated by the portion of available sealift required to support recent military operations. To support military operations in Korea, the United States used only 17 percent of all available U.S.-flag dry cargo ships that were suitable for military transport. For the Vietnam conflict, that figure had grown to 35 percent. The commander of the Military Sealift Command now estimates that a conflict of the same scale as Korea or Vietnam would require about 80 percent of all ships of this kind. 3/ This decline in the cargo fleet is frequently cited as evidence of the need for increased federal support for the domestic shipping industry.

Sustaining these industries, however, would not be cheap. Options examined later in this study suggest that even a modest program to ensure U.S. construction and operation of about 20 new cargo ships a year could

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3. Speech by VADM Kent J. Carroll, USN, Commander, Military Sealift Command, the Propeller Club Convention, Long Beach, California (October 14, 1982).

cost more than $1 billion per year (beyond current support programs whose costs total nearly $1 billion per year). Apparently unwilling to support such costs, the Reagan Administration has eliminated some current subsidies without replacing them with other forms of support.

These trends--fewer subsidies, a shrinking fleet, but continuing national security requirements--have led to concern within the Congress about the adequacy of U.S. shipping and shipbuilding industries. Key issues that the Congress may wish to consider include:

- What capacity and capabilities should the U.S.-flag merchant fleet possess?
- Where are present trends leading the shipping and shipbuilding industries in the current legislative and market environments?
- What level of shipbuilding industrial capability is prudent for national security purposes?
- What maritime policies could help support the U.S. shipping and shipbuilding industries at a prudent level?

These issues are examined in this report.

PLAN OF THE STUDY

The next chapter contains a brief historical review of shipping and shipbuilding in the United States. Chapter III describes the current state of the U.S. shipping and shipbuilding industries and their status in the world market. Chapter IV discusses the role of shipping and shipbuilding in national defense, including recent estimates of expected wartime shipping and shipbuilding industrial support requirements. Finally, Chapter V suggests some alternative policy options, together with an assessment of the effect each option is likely to have on the U.S. merchant marine and its ability to support national security needs.

CHAPTER II. HISTORICAL REVIEW OF U.S. SHIPPING AND SHIPBUILDING POLICIES

Shipping and shipbuilding have been important factors in the American economy since early colonial days. Government support of maritime affairs, accordingly, extends back to the beginnings of American history and useful insights on current maritime problems can be drawn from a review of the national experience in this area. This chapter is a summary of that national experience. Current maritime issues are discussed in Chapters III, IV, and V.

THE COLONIAL PERIOD

In prerevolutionary, colonial America, maritime trade developed early and soon became an economic mainstay of life in the colonies--so much so, in fact, that merchants in England frequently complained to Parliament about the competition from their cousins across the Atlantic. Although some restrictions were placed on colonial maritime activities, from time to time, Parliament wisely permitted the colonists to develop their trade. This decision was motivated then, as would be the case in later years, by a combination of commercial and security reasons. To have stifled colonial maritime trade would have undermined the colonists' economy and with it their ability to buy manufactured goods from England. High levels of exports to the colonies kept English manufacturers busy and their prosperity spread throughout the rest of the country.

At the time of the American Revolution, colonial shipbuilding supplied about one-third of British-flag shipping. Since navies then relied on merchant fleets, not service schools, as the basic training establishments for their crews, any reduction of colonial commerce would have decreased the pool of trained seamen available to the Royal Navy in wartime. Trade reductions forced sailors into other lines of work and inhibited young men from going to sea. Thus, both commercial and security considerations, factors that underlie maritime policy to this day, provided good reasons for England not to interfere with colonial trade and shipbuilding.

Ironically, the policies that permitted the development of colonial shipping and shipbuilding ultimately redounded on the British when the colonies revolted. The prosperity of the colonists provided the money and their trading activities a pool of ships and seamen with which they formed a Navy

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and a fleet of privateers for fighting the British at sea. Colonial shipyards produced both merchant ships and warships for the war effort. Thus, the American maritime industries played a strategic role at the nation's birth--a role whose fundamental character remains unchanged to this day.

FROM THE REVOLUTION TO THE CIVIL WAR--THE PERIOD OF GROWTH

American merchants and shipbuilders emerged from the Revolutionary War to find a radically changed and much bleaker trading environment. The loss of British citizenship restricted access to the once-lucrative trade with the British West Indies and the home islands. It also closed the British market to American shipbuilders. Independence had another disquieting effect in that it removed the worldwide protection of the Royal Navy from American shipping. The challenge of rebuilding trade in the face of these difficulties was a factor fueling the drive toward the stronger form of government established in 1789. Under the Constitution, regulation of international and interstate trade became a function of the national government.

Among the earliest acts of the First Congress (1789-1791) were measures designed to promote American shipping and shipbuilding. These included laws to establish lower duties on goods arriving in U.S. ports on American ships, to provide additional preferential taxes and duties for U.S. ships, and to impose substantially higher tonnage fees on foreign ships than on U.S.-built and operated ships. The latter measure effectively closed the American coastal trade to foreign ships. In addition, the First Congress passed legislation that provided for registry of a U.S.-flag fleet, which gave a boost to the early U.S. shipbuilding industry by requiring that U.S.-flag ships be built in U.S. shipyards.

Stimulated by these measures and aided by the preoccupation of Europeans with the Napoleonic Wars, American maritime activity grew rapidly. By 1795, 92 percent of American imports and 86 percent of exports were carried in U.S.-flag ships. The experience of Salem, Massachusetts, illustrates this growth. In 1791, Salem residents owned a total of 9,031 tons of shipping; by 1800 this grew to 24,682 tons, and by 1807 it reached 43,570 tons. 1/

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1. Robert A. Kilmarx, ed., American Maritime Legacy: A History of the U.S. Merchant Marine and Shipbuilding Industry Since Colonial Times (Boulder, Colorado: Westview Press, 1979), p. 28.

The Congress also acted to rejuvenate the fishing fleet, which had been decimated in the Revolution and had recovered only very slowly during the Confederation period. In 1792, the Congress provided a direct bounty of up to $170 per vessel for fishermen. This stimulus was effective and Massachusetts alone increased its fishing tonnage by 71 percent during the 1790s. In 1818, the Congress enacted a further stimulus in the form of a subsidy of two cents per pound for cod. This resulted in the growth of the fishing fleet from 37,000 tons in 1815 to 163,000 tons in 1860. 2/

The rapid growth of American merchant shipping and shipbuilding continued until it was abruptly interrupted by further government invervention, this time with a disasterously negative effect. In 1807, President Thomas Jefferson decided that he could force economic and political concessions from the European belligerents by closing American ports to foreign trade. The effect on the U.S. economy, particularly on shipowners, seamen, and shipbuilders, was immediate and drastic. An estimated 55,000 seagoing jobs and 100,000 jobs in related activities disappeared. Unfortunately, the effect on the intended victims of this early fling at economic warfare was not nearly so great and the embargo was soon lifted. The momentum of maritime growth was slowed, however, and investment was diverted from shipping to industrialization, notably to the development of the cotton textile industry in New England.

As investment and the predominant source of wealth shifted from trade to manufacturing, the weight of political pressure on national economic policy shifted from free trade to protectionism. Even those whose wealth was originally derived from maritime trade, embraced protectionism, once they had invested in manufacturing ashore. 3/

Nevertheless, the period between independence and the Civil War was one of vigorous growth for American shipping and shipbuilding and is fondly remembered as the "Golden Age." American merchants and seamen astutely seized commerical opportunities to develop new trade routes and built a merchant marine that became a major factor in world trade. Government actions, both in the United States and abroad, influenced this growth at various times. For example, the British Navigation Acts before 1849 forbade British registry to foreign-built ships. But British shipbuilding costs had risen sharply after the Napoleonic Wars and therefore British-flag ships found themselves priced out of trade routes not protected by the Navigation

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2. Ibid., p. 31.

3. Ibid., p. 58.

Acts. The unprotected routes were rapidly seized by lower-cost American ships--a situation with ironic similarities to that faced today by the high-cost American merchant marine. The exclusion of foreign ships from U.S. domestic routes aided American dominance of the lucrative triangular cotton trade before the Civil War. This trade consisted of carrying manufactured goods from northeastern U.S. ports to southern ports, then transporting cotton to Europe, and finally conveying European manufactured goods to the Northeast. Denied cargo on one leg of this triangle, foreign ships could not compete. Thus, stimulated by fortuitous economic circumstances and government policies, the U.S. merchant fleet grew to become second only to that of Great Britain.

This period was also a Golden Age for American shipbuilding. Propelled by ample supplies of timber and entrepreneurial energy, American shipbuilding grew in step with the merchant marine. By 1855, fully 72 percent of American foreign trade was carried in U.S.-built ships. During this period, American marine engineers provided important technical innovations, such as steam power, and the virtuosity of American naval architecture was epitomized by the romantic and graceful clipper ships.

THE CIVIL WAR TO WORLD WAR I--THE PERIOD OF DECLINE

The Civil War proved disastrous to American merchant shipping. Ravaged from all sides--by the Union which requisitioned ships for naval service, by the Confederacy which raided commercial trade, and by ship owners who transferred to neutral flags--the U.S.-flag fleet fell from about 2.5 million gross tons to 1.5 million tons during the war. 4/ This decline was abetted by the loss of the previously lucrative cotton trade during and in the years immediately following the war. Recovery was further slowed by several legislative restrictions that serve as excellent examples of counterproductive maritime policy. One foolishly vengeful law forbade the reregistration of ships that had been registered abroad during the war--a measure whose sole result was inhibiting the rebuilding of the war-ravaged merchant fleet. Duties on imported shipbuilding materials, including iron and machinery, delayed the transition to more efficient iron steam-powered ships. These duties also made American ships more expensive and American shipyards noncompetitive with British yards.

In the last decades of the 19th Century, the nation's energies and investments turned inward--opening the West, building railroads, and ex-

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4. Samuel A. Lawrence, United States Merchant Shipping Policies and Politics (Washington, D.C.: The Brookings Institution, 1968), p. 33.

panding manufacturing. Although the American shipbuilding industry had brought the wooden sailing ship to its fullest development, it fell behind in the new era of propeller-driven iron ships. Leadership passed to British shipbuilders who built such ships better and less expensively than anyone else, and British merchant ships set the standard for efficiency in ocean transportation.

During this period, the ills of American shipping and shipbuilding provoked extensive debate. Many ideas were proposed and some, not necessarily the best, were enacted into legislation. None of the measures tried, however, roused the sluggish maritime industries into robust health.

American maritime interests complained constantly about subsidies supposedly enjoyed by the dominant British and, indeed, there were some. British dominance, however, had little to do with subsidies. Rather, the British were successful because of their ability to put together the components of an efficient maritime system: the early and continued building of inexpensive iron steamships, a telegraph system for collecting and disseminating commercial information, an effective insurance industry, and well-developed financial institutions. 5/ The synthesis of these factors, not subsidies, made the Victorian British dominant at sea. Again, today, the American maritime industries talk about unfair competition from subsidized foreigners, and the question arises whether such subsidies are now, anymore than in the last century, a cause of U.S. maritime problems.

Another interesting parallel with today's maritime policy debate is the long struggle in the 19th Century between the "free ship" advocates and the protectionists. The 1789 law requiring that U.S.-flag ships be built in U.S. yards was still in effect in those days, and, by the end of the 1800s, U.S. shipyard costs were so much higher than those abroad that American owners could not compete. As a result, Americans began to buy ships abroad and operate them under foreign flags. Although this was a new phenomenon in maritime history, by 1901 American shipowners had registered abroad 136 ships of 672,000 gross tons, a tonnage equal to the U.S.-registered international trade fleet and larger than all but four other nations. 6/

For many years, free trade advocates had argued against the laws that brought about this state of affairs. The 40-year struggle finally ended in

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5. Kilmarx, American Maritime Legacy, p. 84.

6. Lawrence, United States Merchant Shipping Policies and Politics, p. 35. The four nations were Great Britain, France, Germany, and Norway.

1910 when a rider to the first Panama Canal Act gave Americans the right to register under the U.S. flag ships built abroad for use in international trade and removed duties from all shipbuilding materials used on U.S.-flag ships. 7/ It proved to be a hollow victory, however, for no strong incentives existed to register under the U.S. flag. Consequently, the U.S. merchant fleet did not grow until stimulated by the shipping needs of the First World War.

U.S. maritime conditions today are strikingly similar to those at the turn of the century. Again U.S. shipyards are not able to meet the prices offered by overseas competition and American shipowners cannot pay U.S. ship prices or U.S. crew wages and still offer competitive freight rates on the world market. Now a substantial flag-of-convenience fleet exists once more. As of January 1, 1983, U.S. privately owned oceangoing ships registered abroad outnumbered those under the U.S. flag by 602 to 573; and the deadweight capacity of those registered abroad was about 57 million tons, nearly three times the 21.6 million tons capacity of U.S.-registered ships. The U.S. flag-of-convenience fleet ranks fourth in the world among national fleets in terms of capacity and, if all U.S.-owned ships were counted as one fleet, that fleet would rank second only to Liberia, the world's favorite flag of convenience (rankings in terms of deadweight capacity). (See accompanying box for definitions of measurement terms used in shipping.) Now, once again, liberalizing requirements for registering in the United States is seen by some as a way of building up the U.S.-flag fleet, and the Administration has proposed legislative initiatives to this end. Historical experience suggests, however, that, unless such liberalization goes far enough to provide positive incentives for registering under the U.S. flag, it would have little effect.

WORLD WAR I AND THE SHIPPING ACT OF 1916

The outbreak of war in Europe in 1914 produced an abrupt crisis in shipping that serves as an object lesson of the hazards of relying on foreign ships to support overseas trade. In 1914, U.S.-flag ships were employed largely in coastal trade with only about 10 percent of American international trade carried in U.S. ships. 8/ U.S. merchants relied chiefly on British, German, French, and Italian ships for overseas transport. With the

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7. Ships used in domestic commerce were, and still are, required to be built in the United States.

8. Currently U.S.-flag ships carry less than 6 percent of U.S. trade.

MARITIME WEIGHTS AND MEASURES

Long Ton. A basic unit of the weight of a ship, used in ship design. It is equal to 2,240 pounds.

Short Ton. A standard ton measurement equal to 2,000 pounds. If used in a shipping context, it usually is associated with cargo weight measurement.

Deadweight Ton. A measurement of the weight of cargo, expressed in long tons, that can be carried by a ship.

Gross Ton. A measurement of the internal volume of a ship. One ton equals 100 cubic feet.

Net Ton. A measurement of the internal volume of a ship with certain spaces excluded. Again, one ton equals 100 cubic feet.

commencement of hostilities, most of these ships were withdrawn from U.S. commerce, paralyzing U.S. ocean transportation. Exorbitant rates were charged for what little shipping remained and insurance rates became prohibitive. This coincided with a record agricultural harvest that had to be dumped on the domestic market, causing prices to plummet. Not only farmers and shippers, but everyone involved with trade faced a disasterous situation.

Within these hardships, however, American merchants perceived the seeds of historic opportunities in the markets abandoned by the belligerents, but opportunities that could not be exploited without shipping. The Congress quickly enacted some measures to help relieve this situation, and private capital rushed to invest in shipping. It was not, however, until 1916 that legislation for a comprehensive program was enacted. The Shipping Act of 1916 contained mechanisms that were intended to see a neutral United States through a period of world strife, but by the time the mechanisms were in place, the United States had entered the war.

The 1916 act established a five-member shipping board as an independent agency with broad powers. The board was authorized to organize and have majority interest in a corporation to implement its programs, which could include purchasing, building, and operating government-owned ships.

The United States entered the war in April of 1917. After some initial delays and confusion, a vigorous effort to build up shipping resources began. These measures included commandeering ships on the ways and afloat, confiscating 700,000 gross tons of German shipping, and inducing neutral ships into U.S. registry. A massive ship construction program was also begun, including the construction of new shipbuilding facilities. 9/ The armistice of November 1918 came before the full effect of the newly constructed ships could be felt in the war effort, but as a feat of industrial mobilization, the shipbuilding program was quite impressive. The mobilization had not really begun in earnest until the summer of 1917, but by the autumn of 1918, American shipyards, with a work force of over 300,000, were turning out shipping at the rate of about 400,000 gross tons per month with 17.4 million gross tons under contract. Ultimately the wartime mobilization effort produced a fleet of 2,312 ships of 13.6 million deadweight tons capacity, raising the U.S. portion of world shipping capacity from 7 percent in 1914 to 22 percent in 1920. 10/

As a result of this massive effort, the United States emerged from World War I with the world's largest merchant fleet. Most of this fleet, however, was owned by the government, which had no desire or mandate to operate it in peacetime trade beyond the five years after war's end provided for in the 1916 act.

THE YEARS BETWEEN THE WARS

Maritime Legislation in the 1920s

The Merchant Marine Act of 1920, or Jones Act, had two main objectives:

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9. Harry N. Scheiber, Harold G. Vatter, Harold V. Faulkner, American Economic History (New York: Harper & Row), p. 332. The 61 shipyards of 1917 with 235 ways increased by November 1918 to 341 shipyards and 1,284 ways, and the number of workers from 45,000 to 380,000.

10. Robert A. Kilmarx, American Maritime Legacy, pp. 123-25; Gary Lee Kavanaugh, The United States Shipbuilding Industry and the Influences of Conglomerates (Cambridge: Sloan School of Management, Massachusetts Intitute of Technology, 1977), pp. 18-19.

- To provide for the transfer of the shipping board's vast fleet of ships to private hands; and

- To establish a framework in which the fleet could operate profitably in private hands.

The act begins with a succinct statement of national maritime policy that reflects the enduring concerns of commercial advantage and national defense:

> . . . That it is necessary for the national defense and for the proper growth of its foreign and domestic commerce that the United States shall have a merchant marine of the best equipped and most suitable types of vessels sufficient to carry the greater portion of its commerce and serve as a naval or military auxiliary in time of war or national emergency ultimately to be owned and operated privately by citizens of the United States; and it is hereby declared to be the policy of the United States to do whatever may be necessary to develop and encourage the maintenance of such a merchant marine, . . . 11/

This policy statement was carried forward to the 1936 Merchant Marine Act, with the substitution of the more realistic word "substantial" for "greater" in the phrase "the greater portion of its commerce." So modified, this remains the stated national maritime policy to this day.

Among the features intended to "encourage the maintenance of such a merchant marine" was the reaffirmation and strengthening of the longstanding practice of cabotage, that is, reserving all coastal trade, including trade with offshore possessions, to U.S. built, owned, and crewed ships. Although the act contained many other provisions, use of the term "Jones Act" today usually refers to cabotage.

The optimism attending passage of the 1920 act soon dissolved as demand for shipping collapsed in the early 1920s. By 1922, 17 percent of the world's shipping was idled. 12/ The shipping board began to lose money on its ship operations, increasing pressures for divestiture; but the same slack

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11. Merchant Marine Act of 1920, 41 Stat. 988, chapter 250, approved June 5, 1920, as amended by the 96th Congress.

12. Lawrence, United States Merchant Shipping Policies and Politics, p. 42.

market conditions made divestiture, even at severely reduced prices, very difficult. The huge overhang of war-built ships reduced demand for new ships, and as time went by, the American fleet was steadily out-performed by newer ships built abroad.

In 1928 the Congress attempted to stimulate the merchant marine through legislating indirect subsidies including, most notably, mail contracts. By the mid-1930s, however, the several investigative panels created to review the 1928 legislation had concluded that it was promoting graft and inefficiency, not the merchant marine.

The U.S.-flag share in the carriage of U.S. foreign trade had fallen to 33 percent by 1933 from its 1922 high of 51 percent. The Roosevelt Administration concurred with the Congressional view that the United States should have an adequate merchant marine. But the Administration decided that, if subsidies were necessary to sustain one, the government should abandon the subterfuge of indirect supports and move to subsidies that were open, direct, and called by their proper name.

The Merchant Marine Act of 1936

Ultimately, the Congress passed the landmark Merchant Marine Act of 1936, legislation that, with many revisions, remains the basis of U.S. maritime policy today. As the first systematic peacetime formulation of a national maritime policy, it adopted a nationalistic and protectionist approach to maritime affairs that wove indirect subsidies and aggressive new direct subsidies into a structure that its sponsors hoped would produce the desired level of maritime activity. The legislation was, in addition, a product of its time, the Great Depression. Economic recovery and the provision of badly needed jobs was very much on the minds of those who drafted and supported the legislation.

Major objectives of the Merchant Marine Act of 1936 were to create a substantial fleet of U.S.-flag merchant ships, to build the ships in U.S. shipyards, and to ensure they were owned and crewed by Americans. To achieve these goals, the act established a series of logical mechanisms. To stimulate shipbuilding in the United States, it provides for a construction differential subsidy (CDS), a direct subsidy that covers the difference in price between a ship built in the United States and the price for the same ship built abroad. To stimulate operation of American-built ships with American crews, the act provides for an operating differential subsidy (ODS), a direct subsidy that covers the difference in operating costs between an American operator using an American ship and crew compared with his foreign competitors. The act also assists in financing new ships by providing government loan guarantees (Title XI) and by authorizing a tax-deferred Capital

Construction Fund. 13/ If the subsidies and financing aids do not stimulate the private sector to build and operate a sufficient number of ships, the act authorizes the government to build ships and to charter them to American commercial operators. The legislation also contains a section dealing with the citizenship, wages, working conditions, and rights of seamen on subsidized ships.

To administer these complex provisions, the act established the U.S. Maritime Commission, a five-member independent regulatory agency to replace the Shipping Board of the 1916 act. Soon after it was established, the Maritime Commission initiated a program to build 50 new ships a year over the next decade. The program for these ships, built to standard designs developed by the commission staff, helped give the shipbuilding industry a running start on the formidable challenges that it would have to meet during World War II.

The Merchant Marine Act of 1936 is a remarkably comprehensive and durable piece of legislation. That it has endured for nearly 50 years, and has served, however imperfectly, in that long period to provide a merchant marine and shipbuilding industry adequate for the nation's essential maritime needs, in both war and peace, is a credit to the government processes that produced and sustained it. Whether this legislation and its mechanisms are adequate for the future is an issue for today's policymakers to decide.

WORLD WAR II

World War II had a far-reaching effect on maritime policy and on American perception of the importance of maritime affairs. This war, in which American forces were engaged in worldwide combat, demonstrated more emphatically than ever before how acutely U.S. national security is dependent upon cargo shipping. This imperative has continued into the postwar period as American foreign policy and commercial interests have actively involved the United States in all parts of the world.

The accomplishments of the U.S. merchant marine and the shipbuilding industry in World War II were truly incredible feats of mobilization. In 1936, when the Merchant Marine Act was passed, only eight merchant ships with a total capacity of 105,000 deadweight tons were delivered. By 1939, when hostilities began, production had grown to 28 ships of 342,000 deadweight tons, but still short of the Maritime Commission's goal of 50 ships per year. Experience in World War I had given some indication of how rapidly

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13. For a more complete description of these measures, see Appendix C.

American industry, once mobilized, could increase production, but the accomplishments of World War II exceeded all expectations. On January 1, 1942, three weeks after the United States entered the war, the Maritime Commission set cargo ship production goals of 6.2 million deadweight tons for 1942 and 8.1 million deadweight tons for 1943. 14/ Actual production was much greater: 724 ships of 7.9 million deadweight tons in 1942 and 1,661 ships of 18.5 million deadweight tons in 1943. U.S. industry produced nearly 5,000 ships with a total capacity of about 53 million deadweight tons during the war years, a feat that enabled the Allies to emerge from the war with twice the shipping capacity that they had entered with, despite heavy wartime losses.

As in any mobilization, there was concern that a shortage of skilled labor would inhibit production. It is an interesting point that this was not a major problem for the shipyards in World War II. Employment in private shipyards soared from 80,000 in June 1939 to 1,459,000 in November 1943, an increase of 1,800 percent; at the same time production increased from 241,000 gross tons in 1939 to 12.5 million gross tons in 1943, an increase of 5,180 percent. Clearly, productivity did not suffer as hordes of new and untrained workers came into the shipbuilding industry. A major reason for this improved productivity was a shift from the custom-built individual ships to "ship manufacturing." The wartime ships were built with series production techniques that provided dramatic "learning curve" efficiencies. The 2,580 basic Liberty ships (EC2-S-C design) were built in 18 shipyards, an average of 143 per yard. The average time on the ways for Liberty ships decreased from about 150 days in 1941 to just over 40 days in 1943, and the average number of manhours to construct the twentieth Liberty ship built by a typical shipyard was only about one-third of that required to build the first ship. Rather than being taught many skills, as in the lengthy peacetime apprentice program, new employees in wartime yards were taught only a few specialized skills, which they performed repeatedly on the continuous procession of ships produced. This is very efficient, but possible, of course, only when there is an extraordinary demand for multiple ships of the same type, as was the case during World War II.

The industrial mobilization of World War II produced not only great numbers of ships but also massive increases in shipbuilding facilities. The United States began the war with 11 naval and 19 major private shipyards. Emergency expansion programs created new facilities at all the existing yards and 21 new emergency shipyards, built under government sponsorship. In fact, almost all the Liberty ships discussed above were among the ships

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14. Kilmarx, American Maritime Legacy, p. 181.

produced in these new emergency yards. This rapid expansion resulted in a fourfold increase in U.S. shipbuilding capacity, demonstrating the growth of shipbuilding resources that can be achieved under the impetus of a national emergency. 15/ It should be noted, however, that the cargo ships produced in that time were relatively simple standard designs and that this rapid expansion proceeded from an established base containing seasoned technical and managerial resources.

THE MARITIME INDUSTRIES AFTER WORLD WAR II

The United States emerged from World War II with a fleet of about 4,500 ships suitable for commercial use, more than all other nations combined. The Merchant Ship Sales Act of 1946 established guidance for the demobilization of this vast fleet. In accordance with the postwar reconstruction policy of encouraging international economic development and the reestablishment of trade, the United States did not try to maintain a position of dominance in international shipping. The 1946 act, therefore, provided for the sale of cargo ships at attractive prices to foreigners as well as U.S. citizens. Nearly 2,000 ships were sold under this program, about 57 percent of them to foreigners. Many of the remaining ships, about 1,400, were laid up in the National Defense Reserve Fleet, available for mobilization in an emergency.

The vigorous activity of the war years produced no enduring benefits for either the shipbuilding or ship-operating industries. Although the United States deliberately relinquished its overwhelming shipping dominance in 1945, the percentage of U.S. trade carried in U.S.-flag ships has continued to decline since that time. Under the pressure of foreign competition, this decline has now continued to a level that many observers believe is imprudent. War-damaged shipyards, particularly those in Japan, were rebuilt with more modern facilities than those in U.S. yards. This factor, coupled with innovative management and lower labor costs, has made it difficult for U.S. shipyards to meet the prices offered by foreign shipbuilders. By 1970, the

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15. The term rapid as used here is relative. Even under the stimulus of war, it still takes a significant amount of time to build shipyards. The average time to construct a new shipbuilding position (way) for the Maritime Commission program was six months. The Bethlehem-Fairfield yard near Baltimore with 16 ways (making it the second largest non-Navy yard) was built in 21 months, an incredibly short period of time for such a large facility.

average age of the U.S.-flag fleet (22 years) was twice that of the United Kingdom and three times that of Japan.

A major effort to restore the health of the maritime industries was embodied in the Merchant Marine Act of 1970. The primary objective of this legislation was to revitalize both the ship-operating and shipbuilding industries by stimulating the construction of 300 modern merchant ships over a period of ten years. The main features of the act were to:

- Authorize a program to rebuild the merchant fleet with modern ships of standardized design, built with series production methods;
- Provide construction differential subsidies paid directly to the shipbuilder;
- Make bulk carriers eligible for operating differential subsidies and construction differential subsidies;
- Expand the federal ship mortgage insurance program;
- Institute a new capital construction fund program to allow tax deferral of income for ship replacement;
- Expand the maritime research and development program; and
- Establish a descending scale of maximum rates for construction differential subsidies to induce the shipbuilding industry to reduce ship costs.

After an initial surge in shipbuilding demand, this ambitious program stumbled as a result of the 1973 oil embargo by the Organization of Petroleum Exporting Countries (OPEC) and the worldwide collapse in demand for shipping in the ensuing recession.

During the postwar period, other legislation has affected the shipping and shipbuilding industries. These laws include some that provide preference for U.S.-flag ships for certain kinds of cargoes. One measure, the Cargo Preference Act of 1954, requires that 50 percent of the gross tonnage of government-generated (also known as government-impelled) cargoes be carried on U.S.-flag ships. Another law, passed in 1977 to appropriate funds for the Strategic Petroleum Reserve Program, stipulates that at least 50 percent of oil purchased overseas for this program must be shipped in U.S.-flag ships. Such measures are important to the segments of the shipping industry that benefit from them, but they have a limited effect in the broader context of providing a strategically useful merchant marine.

In the mid-1980s, the U.S. merchant marine is very much alive but beset with problems created by high operating costs and slack demand. The shipbuilding industry is faced with the same problems: high costs relative to overseas competition and slack demand for its products. These are problems that have existed in the past and, unfortunately, have never been satisfactorily resolved. When faced with this situation on the eve of World War I and again just before World War II, the extraordinary stimulus of war mobilization revitalized the maritime industries. Perhaps some less drastic cure can be found in the future.

CHAPTER III. CURRENT U.S. SHIPPING AND SHIPBUILDING

The United States today possesses a substantial merchant fleet, but one that is burdened with higher capital and operating costs than its foreign competition. As a result, it is struggling for survival in a chronically slack world shipping market. The fleet exists largely because of a web of subsidies and supports provided by U.S. law, supports that are often matched or exceeded by other maritime nations. Prospects for a viable U.S. merchant marine will depend on achieving a combination of market efficiency and government support that will permit it to compete successfully for cargo.

Although the United States still has the world's largest shipbuilding industry, it is currently unable to match the prices or delivery schedules for merchant ships offered by foreign shipbuilders. With the exception of building and repairing ships for the U.S. Navy, a market reserved for U.S. shipyards, these yards have little business today. This suggests a decline in the shipbuilding base that could have important national security ramifications.

This chapter provides a brief overview of the current U.S. shipping and shipbuilding industries. Appendix A contains tables summarizing recent numerical indicators for the industries. For a more comprehensive description of the U.S. shipping and shipbuilding industries, see the report of the Office of Technology Assessment, An Assessment of Maritime Trade and Technology, OTA-0-220 (October 1983).

THE U.S. SHIPPING INDUSTRY

If all ships owned by U.S. citizens, including those registered abroad, are aggregated, the United States has the largest national merchant fleet in the world in terms of total cargo capacity. Any statement about the size or utility of this fleet, however, depends on how the ships are categorized and what categories are included.

A Profile of U.S. Shipping

The cargo ship assets of the United States may be categorized in various ways, including whether they are:

- Registered in the United States or abroad,

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- Active or inactive, and
- Privately owned or government owned.

A summary of U.S.-owned cargo shipping as of January 1, 1984, grouped in these categories, is displayed in Table 1.

As can be seen in Table 1, a major portion of the U.S.-owned fleet, with 68 percent of the total cargo capacity, is registered abroad. U.S. owners have chosen this course because, for reasons that are discussed below, the cost of operating under U.S. registry is too high in most trades to allow U.S.-flag ships to compete for cargo. This use of "flags of convenience" has been a recurring phenomenon in U.S. maritime history (see Chapter II). Many defense observers are uneasy about the reliability of these ships in supporting U.S. interests, particularly military sealift in wartime. The owners of such ships, who prefer the term "flag of necessity" for foreign registration, argue that most of their ships would be available in an emergency, to carry economic cargoes if not military personnel and material.

A substantial segment of U.S.-owned ships under foreign flags (389 ships as of May 1984) is registered in four countries--Liberia, Panama, Honduras, and the Bahamas. These are commonly referred to as the Effective U.S. Control (EUSC) Fleet. 1/ EUSC owners have made commitments, contractual and otherwise, to the U.S. government that their ships will be available to the United States in the event of war or national emergency in the same manner as U.S.-flag vessels. Nevertheless, the reliability of foreign crews will always be subject to some, possibly unjustified, question. Another disadvantage is that the EUSC fleet consists mostly of large bulk cargo carriers and large tankers that are of limited utility in military support roles.

The oceangoing U.S.-flag fleet consisted of a total of 788 ships as of January 1, 1984. Of these, however, only 439 were active; the rest were laid up in various states of inactivity. The U.S.-flag fleet has a greater variety of ships than the EUSC fleet, including many more that would be well-suited to military sealift duties. It also provides a pool of trained U.S.-citizen mariners that would be required to man a military sealift fleet. Table 2 presents a summary of the U.S.-flag fleet, broken down by trades and status, as of January 1, 1984. Tables providing more detail about U.S. shipping are included in Appendix A.

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1. These 389 ships have a total deadweight capacity of 41,667,000 tons, which exceeds by a wide margin that of the U.S.-flag fleet.

TABLE 1. U.S.-OWNED MERCHANT SHIPS AS OF JANUARY 1, 1984
(1000 gross tons and over)

Merchant Ships	Number of Ships	Capacity (In thousands of deadweight tons)	Percent of Capacity (by weight)
U.S.-Flag Oceangoing Ships			
Active Fleet			
Privately owned	428	17,116	20
Government owned	11	93	--
Subtotal	439 a/	17,209	20
Inactive Fleet			
Privately owned	110	4,454	5
Government owned	239	2,746	3
Subtotal	349 a/	7,200	8
Total, U.S. Flag, Oceangoing	788	24,409	28
U.S. Great Lakes Fleet	143	3,099	4
U.S.-Owned Ships Registered Abroad b/	602	57,118	68
Total U.S.-Owned Fleet	1,533	84,626	100

SOURCE: Maritime Administration.

a. Subtotals are not added in to achieve "Total U.S.-Owned Fleet."
b. As of January 1, 1983, the latest available data.

United States Versus Foreign Ship Operating Costs

Operators of U.S.-flag ships incur higher expenses than their foreign competition in almost every cost category. U.S.-flag ships must be manned by U.S. citizens and, to qualify for certain benefits, must be built in U.S.

TABLE 2. SUMMARY OF U.S.-FLAG OCEANGOING SHIPS, BY TRADE AND STATUS AS OF JANUARY 1, 1984

Ships by Trade/Status	Number of Ships	Capacity (In thousands of deadweight tons)
Active Fleet		
Foreign trade a/	138	3,555
Foreign to foreign b/	25	1,353
Domestic trade c/	210	10,900
U.S. agency operations	66	1,401
Subtotal	439	17,209
Inactive Fleet		
Temporarily inactive	18	1,006
Laid up	108	3,667
National Defense Reserve	223	2,527
Subtotal	349	7,200
Total, U.S.-Flag Fleet	788	24,409

SOURCE: Maritime Administration.

a. Ships operating between U.S. ports and foreign ports.
b. Ships operating between foreign ports without regularly entering U.S. ports.
c. Ships operating between U.S. ports, excluding the Great Lakes fleet.

shipyards. All of this leads to higher capital and operating costs compared to the rest of the current world market.

Higher Crew Costs. The American crew mandated for U.S.-flag ships is one major cause of higher costs. Not only are wages paid to American seamen substantially higher than those paid abroad but crew-related costs, such as subsistence and insurance, are much higher. A comparison of annual crew costs (wages and subsistence) for a representative modern containership is shown in Table 3. U.S. crew costs have reached levels that typically are 2.5 times those of European crews and over six times those of Third

TABLE 3. TYPICAL CONTAINERSHIP ANNUAL CREW COSTS, UNITED STATES AND FOREIGN MANNING, 1983

Costs	Crew Nationality		
	United States	United Kingdom	Singapore
Wages (In dollars)	3,780,000	1,433,000	570,000
Subsistence (In dollars)	124,000	82,000	53,000
Ratio to United States	1.00	0.39	0.16

SOURCE: Maritime Administration.

World crews. In part this difference parallels differences in living standards, but a contributing factor for the substantial payment over European levels may be the operating differential subsidy (ODS) system--discussed below--through which all crew costs beyond those of foreign competition are simply passed on to the government as an additional subsidy claim. Replacement of this type of government support with other forms that expose wage settlements to market pressures might reduce this gap between U.S. and foreign crew costs.

As an example of pay levels achieved by some U.S. merchant mariners, the commander of the Military Sealift Command testified before the Congress that annual costs for the master of a LASH ship (Lighter Aboard Ship) totaled $302,474 in 1982 (see Table 4). This is, however, one of the highest paid billets in the merchant marine and the billet is normally shared by two persons. Maritime labor representatives have argued that this compensation is justified by the complexity of the LASH ship. According to other data presented in testimony to the Congress, the master of a small commercially operated U.S.-flag tanker received about $171,000 in wages and benefits in 1982. 2/ By comparison the captain of a U.S. Navy aircraft carrier is paid about $70,000 per year, including base pay, allowances, and the actuarial value of future retirement benefits.

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2. Testimony of Jesse M. Calhoon, President, National Marine Engineers Beneficial Association, before the Seapower and Strategic and Critical Materials Subcommittee of the House Committee on Armed Services, 98:1 (April 25, 1983).

TABLE 4. ANNUAL BILLET COSTS FOR MASTER, LASH SHIP, 1981, 1982, AND 1983 (In dollars) a/

Costs	1981	1982	1983 b/
Direct Compensation			
Wages	93,148	98,988	113,125
Overtime	21,815	23,654	26,859
Total Compensation	114,963	122,642	139,984 c/
Payments to Union Administered Plans			
Vacation	79,816	105,355	122,571
Pension	37,671	48,039	55,332
Medical	6,532	6,420	6,420
Independent Retirement Account	8,227	9,981	11,527
Training	1,873	1,438	1,438
Joint Employment Commission	336	281	281
Maritime Institute of Research and Industrial Development	378	277	277
Total Payments	134,833	171,791	197,846 c/
Payroll Taxes	4,436	4,833	5,834
Feeding Costs	3,099	3,208	3,321
Grand Total	257,331	302,474	346,985

SOURCE: Testimony of Vice Admiral Kent J. Carroll, Commander, Military Sealift Command, to the Subcommittee on Seapower and Strategic and Critical Materials of the House Committee on Armed Services, 98:1 (April 5, 1983).

a. LASH stands for "Lighter Aboard Ship" which is a type of barge carrying ship chartered by the government for use as a Maritime Prepositioning Ship.

b. Estimated.

c. In subsequent testimony, Captain Robert J. Lowden, President, International Organization of Masters, Mates, and Pilots, stated that these totals should be $123,902 for direct compensation and $184,719 for payments to union administered plans.

TABLE 5. 1983 SHIPBUILDING COSTS, UNITED STATES AND JAPAN
(In millions of dollars)

Country	Containership (2,450 20-foot equivalent units)	Bulk Carrier (35,000 deadweight tons)	Tanker (90,000 deadweight tons)
U.S. Built	132.0	69.0	96.0
Japanese Built	50.8	22.5	34.3

SOURCE: Maritime Administration.

Higher Capital Costs for U.S.-Built Ships. Capital costs are another important cost category for U.S.-built ships. Prices for U.S. merchant ships are much higher than for those built abroad, particularly in comparison with ships from Japanese and Korean yards. Not only are U.S. prices about three times those of Asian yards (see Table 5) but delivery time is almost always less for a foreign-built ship. A factor contributing to the cost difference between foreign and U.S. shipyards is not only real wage and benefit differences between American and foreign producers, but the continuing strength of the dollar relative to the currencies of other shipbuilding nations.

Despite these higher costs, U.S. ship operators have had strong incentives to buy their ships from American shipyards since many benefits provided by the government to U.S.-flag ships, including subsidy payments, cargo preference, tax benefits, and access to domestic trade, have been restricted to U.S.-built ships. Recent legislative initiatives proposed by he Administration (H.R. 3156/S. 1038) would liberalize some of these benefits so that they could be provided for foreign-built, U.S.-flag ships. In addition, the Administration has discontinued funding the construction differential subsidy program, formerly a prominent form of support for the U.S. shipbuilding industry (see Appendix C).

Not even a resumption of the ship construction subsidies would fill the present ship price gap under current rules. Construction differential subsidy (CDS) payments are limited by law to no more than 50 percent of the U.S. ship price. Therefore, even if CDS funds were requested by the Administration and appropriated by the Congress, ship operators could still obtain ships

abroad for less, unless U.S. ship prices become more competitive or the 50 percent limit is raised. In the meantime, apart from temporary relaxation allowing operating differential subsidies (ODS) to some foreign-built ships, most other forms of government support apply only to U.S.-built ships.

Higher Fuel Costs. The typically higher fuel consumption of U.S.-built ships adds another cost disadvantage for U.S. operators. The most efficient foreign ships are propelled by slow-speed diesel engines which have very low fuel consumption. Most U.S.-built ships are steam-turbine propelled. These ships tend to be faster than diesel ships, a useful military characteristic, but they also have high fuel consumption rates, which was not a major concern when fuel was relatively cheap. 3/ In addition, subsidized ships are not only required to be built in the United States but to be built with U.S.-manufactured equipment, and until recently, slow-speed diesel engines were not made in this country. Although such engines are now manufactured under license in the United States and have been fitted into some recently built ships, most U.S.-flag ships continue to have relatively high fuel costs. The annual cost impact on representative ship types is shown in Table 6.

Summary of Costs. When all these costs are brought together, it is apparent that U.S. ship operators encounter significant cost disadvantages. As a concrete example, Table 7 compares the costs faced by a U.S. shipowner operating a typical modern containership with the costs of his foreign competition (or a U.S. owner operating under a flag of convenience), using three hypothetical ships:

- Ship A--built in the United States and manned by an American crew;
- Ship B--built abroad but manned by an American crew; and
- Ship C--built abroad and manned by a foreign crew.

Among the examples above, the free market freight rates would be governed by ship C, which can operate profitably at lower rates than either A or B. Ship A has very high capital costs because of the high price of U.S.-

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3. A further rationale for the predominance of steam-turbine propelled ships over diesel propelled ships in the U.S.-flag fleet is that steam machinery usually requires less maintenance than diesel engines. When fuel was cheap, relative to the cost of labor, it was sensible for U.S. operators to substitute higher fuel consumption for higher maintenance. The abrupt rise in the price of fuel changed the factors underlying this tradeoff.

TABLE 6. ANNUAL FUEL COSTS FOR COMPARABLY SIZED SHIPS USING STEAM-TURBINE AND DIESEL ENGINES (In dollars)

Ship	Steam Turbine	Diesel
1970 Containership (1,200 20-foot equivalent units)	3,600,000	2,700,000
1980 Containership (1,700 20-foot equivalent units)	5,500,000	4,600,000
Mid-1970s Tanker (90,000 deadweight tons)	5,204,000	3,700,000

SOURCE: Paul Ackerman, "Comparative Operating Costs for U.S. and Foreign-Flag Ships," Proceedings of the Ship Costs and Energy Symposium, 1982, The Society of Naval Architects and Marine Engineers, New York, New York.

built ships, but even when the ship is built abroad, as in case B, and equipped with the most efficient propulsion, it is still unable to compete because of higher expenses in other categories, principally crew costs. 4/

4. It should be noted, however, that free-market pricing for shipping services does not always occur in practice. When there is more ship capacity available than cargo to be carried, a common situation in the shipping business, free market pressures will tend to drive freight rates down toward the point at which only the variable operating costs of the more efficient operators are recovered. A shipowner faced with slack demand can either lay up his ship or continue to operate with whatever revenues he is able to obtain. If his revenues cover his costs of continued operations, fuel, crew, subsistence, and so forth, he usually will continue to operate in hope of better times even if capital costs are not being recovered. Thus, freight rates are driven down below the true cost of providing the service. The traditional reaction of shipowners to these grim economic facts has been to seek relief in

These three cases are significant from a policy standpoint. Ship A meets the stated objective of U.S. maritime policy--an American flag ship, built in the United States, and manned by Americans--but its costs are very high. Ship B represents the direction in which current Administration policy initiatives are leading--initiatives that would reduce capital costs but that would also diminish incentives for U.S. operators to procure ships from American shipbuilders. Ship C typifies the flag of convenience ships in the Effective U.S. Control Fleet.

If the United States is to maintain a substantial U.S. merchant marine, inherent and longstanding differences in costs, such as those illustrated in Table 7, must be overcome by productivity gains or, more likely, made up by some package of direct and/or indirect government supports. Ship A would require a subsidy package nearly equal to the entire operating cost of Ship C. Ship B would result in significantly lower costs but at the expense of abandoning previous programs supporting commercial ship construction in U.S. shipyards. Ship B would provide jobs for some American seamen, about 35 billets for a typical containership, but it would still require about $4,600,000 (or about $130,000 per year per billet) in direct and indirect subsidies to be competitive with Ship C.

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collective action. Shipowners form associations called "conferences" in which they seek to moderate and regulate their competition to the degree permitted by the antitrust laws of the countries served. In their more unrestrained form, conferences can exercise considerable monopolistic power, including price fixing and exclusion of new entrants to the trade. Conferences are permitted in U.S. cargo trades despite the clear conflict with antitrust laws, because they are a fact in world liner shipping and because they do help to stabilize shipping rates and ensure the availability of adequate service. But the more abusive practices found abroad, such as excluding new entrants, are prohibited.

Conferences are predominantly found in the liner trades, in which ships operate as common carriers on regularly scheduled routes. True free market conditions are more nearly approximated in the bulk trades in which ships are normally chartered to move cargo in shipload lots and the charters go to the lowest bidder. U.S.-flag bulk carriers are predominantly employed in the domestic trades where foreign competition is not permitted. In the international liner trades, U.S.-flag ships also maintain a significant presence, carrying 24.5 percent by weight and 27.1 percent by value of U.S. international liner cargo in 1983.

TABLE 7. ILLUSTRATIVE ANNUAL OPERATING COSTS FOR 30,000 DEADWEIGHT TON CONTAINERSHIPS

	A	B	C
	Ship Comparisons		
Where Built	United States	Japan	Japan
Crew Nationality	United States	United States	Singapore
Propulsion	Steam	Diesel	Diesel
	Ship Costs (In thousands of dollars)		
Wages	3,780	3,780	570
Subsistence	124	124	53
Supplies	247	247	158
Maintenance	1,050	1,050	471
Insurance	933	933	328
Other	77	77	30
Fuel	5,500	4,600	4,600
Capital	14,200	5,200	5,200
Cargo/Port	4,600	4,600	4,600
Total	30,511	20,611	16,010
Cost Per Delivered Ton	61	41	32

SOURCE: Estimates compiled by CBO based primarily on Maritime Administration data.

Subsidies and Supports for the U.S. Shipping Industry

Periodically during the past 200 years, the U.S. maritime industry has, as now, found itself uncompetitive in international shipping. In order to maintain a merchant marine in the face of persistent adverse costs, a pack-

age of direct and indirect supports has evolved over the years. These are of several different general types: direct subsidies, cargo reservation, direct government procurement and/or operation of cargo shipping, and tax and financing support. Within these categories, specific programs provided in current law are shown in the accompanying box.

The basic legislation supporting current U.S. maritime policy is the Merchant Marine Act of 1936, whose history is outlined in Chapter II. This landmark legislation provided the framework for the incredible expansion of U.S. shipping in World War II and is the most important legislation supporting, however imperfectly, the continued existence of a U.S.-flag merchant fleet. The wisdom of providing subsidies to the maritime industries is both supported and attacked on economic grounds (see Appendix B). But, without the existing forms of government support, the U.S.-flag shipping industry would almost certainly be much smaller than it is today. The forms adopted for the support of the maritime industries affect not only their existence and size but also their potential for supporting military operations.

Military Considerations for Cargo Shipping

From the standpoint of national security, one of the most important distinctions to be made among cargo ships is that of military utility. In general, the most useful ships for supporting military operations tend to be:

- Relatively small--able to go in and out of shallow harbors and narrow channels;
- Flexible--able to carry a variety of cargoes; and
- Self-sustaining--able to load and off-load cargo without specialized shore facilities.

Unfortunately, these characteristics are at odds with those of the most efficient commercial ships, which tend to be large, specialized, and dependent on port facilities for efficient loading and offloading. From a military standpoint, an old-fashioned, breakbulk freighter, with its loading booms and cargo nets, is usually more useful than a commercially efficient modern containership that depends upon special port facilities for loading and offloading. Small, clean-product tankers are more useful for military support than the very large crude oil carriers that are commercially efficient in today's tanker trade.

A recent assessment of militarily useful ships in the U.S.-owned fleet is shown in Table 8. Military utility is relative, not absolute. Sometimes

Direct Subsidies

Construction Differential Subsidy (CDS). A subsidy paid to shipyards to cover the difference between the cost of building a ship in the United States and building it abroad.

Operating Differential Subsidy (ODS). A subsidy paid to ship operators to cover the difference between the cost of operating a ship under the U.S. flag with a U.S. crew and the cost of operating under a foreign flag with foreign crews.

Cargo Reservation

Cabotage. All cargo shipped by water from one U.S. port to another U.S. port must be carried in U.S.-flag ships, built in U.S. shipyards, and crewed by U.S. citizens.

Military Cargoes. The Military Transportation Act of 1904 requires that all supplies for the U.S. armed services must be carried in U.S.-flag ships.

Government Impelled Cargoes. At least half of all exports resulting from activities of government agencies such as the Export-Import Bank must be shipped in U.S.-flag ships. The formula of 50 percent participation by U.S.-flag ships is applied by several different cargo preference laws, including ones covering such diverse commodities as agricultural products, strategic petroleum reserves, and military assistance exports.

Government Procurement and Operation of Cargo Ships

Military Sealift Command (MSC). Not only is the Department of Defense the largest single customer of the privately owned U.S. shipping industry but it also operates its own fleet of government-owned and chartered ships, a fleet numbering 133 ships as of April 1984.

Tax and Financing Support

Title XI Ship Mortgage Guarantees. Title XI of the Merchant Marine Act of 1936 authorizes the government to guarantee up to 87.5 percent (75 percent for ships built with CDS) of the purchase price of ships built in U.S. shipyards. The total contingent liability limit for this program has been successively raised over the years and is now $12 billion (but about $2.5 billion is reserved for Ocean Thermal Energy Conversion and fisheries programs).

Capital Construction Fund (CCF). Established by the Merchant Marine Act of 1970, this program allows deferral of federal taxes on funds deposited in the CCF and on funds withdrawn if they are used to build or reconstruct certain ships in U.S. shipyards or to acquire U.S.-built ships. In the 1971-1981 period, $2.4 billion was deposited in and $2.0 billion was withdrawn from this fund.

Investment Tax Credits. Shipowners are entitled to investment tax credits for funds invested in ships in the same way that businessmen in other industries are entitled to such credits for investment in new capital equipment.

TABLE 8. MILITARILY USEFUL SHIPS IN THE U.S.-OWNED FLEET: OCEANGOING SHIPS OF 1,000 GROSS TONS AND OVER AS OF JANUARY 1, 1984

Category	Total Ships	Militarily Useful Ships
U.S.-Flag		
Active Fleet	439	294
Inactive	349	325
Subtotal	788	619
Registered Abroad	602 a/	84
Total, U.S.-Owned Fleet	1,390	703

SOURCE: Maritime Administration and Navy Department.

a. As of January 1, 1983.

modifications can turn initially unsuitable ships into useful ones. The assessment of militarily useful ships shown in Table 8 was provided to CBO by the Maritime Administration (MarAd) and represents the Navy/MarAd judgment against a range of assumed contingencies. Since almost every ship has some conceivable military use in some circumstances, such assessments can, and do, vary. These figures indicate, however, that only about two-thirds of active U.S.-flag ships are readily useful for military support, a figure that rises to 79 percent if inactive ships are included. Among U.S.-owned ships registered abroad, only 14 percent are considered militarily useful, principally because most of these ships are large tankers and dry-bulk carriers that are among the least useful ship types for military support.

Perhaps the most persistent and disturbing trend in the U.S. merchant marine over the past three decades has been the steady decline in the inventory of ships. The number of militarily useful, dry-cargo ships available today is only about 18 percent of that available in the Korean War. This suggests that an important segment of the militarily useful merchant marine is shrinking rapidly and approaching a point where it may not be adequate to support military operations of even the Korea/Vietnam scale. This, clearly, is an important national security issue and is discussed further in subsequent chapters.

The U.S. Shipping Industry in the World Market

The United States not only has the world's largest national economy, but it also has the world's largest volume of foreign trade (imports and exports). In 1983, U.S. trade amounted to $470 billion. 5/ While the total value of this foreign trade carried in ships was $267.5 billion, U.S.-flag ships were relatively modest participants carrying only 16.2 percent by value and less than 6 percent by weight.

An interesting perspective on the history of U.S.-flag participation in the carriage of its foreign trade is provided by Figure 1. Since the passage of the Merchant Marine Act of 1920, with its bold declaration of maritime policy objectives, the trend in U.S.-flag participation has been down, with the exception of the bulge created by the World War II emergency shipbuilding program.

In their current operations, U.S.-flag ships participate most vigorously in the liner sector. In this area, innovations such as containerization have improved productivity, and ODS payments have sustained American operators. In the bulk trades, in which contracts go to the lowest bidder, U.S.-flag ships are rare. In general, U.S. owners tend to register liner ships in the United States in order to qualify for subsidies and cargo preference and to register bulk carriers abroad to minimize costs. 6/ (See accompanying box for a description of types of cargo ships.)

When U.S.-flag bulk carriers have managed to survive despite lower-cost foreign competition, cargo reservation has played an important part. All domestic cargo trade is reserved for U.S. ships; certain international cargos, such as 50 percent of Public Law 480 agricultural commodities and

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5. By comparison, the trade of other major nations in 1983 was $322 billion for West Germany, $273 billion for Japan, $200 billion for France, and $192 billion for the United Kingdom. Moreover, trade is an increasingly important component of the U.S. gross national product. Between 1970 and 1980, the value of foreign trade as a portion of GNP increased from 8.6 percent to 18.2 percent, but by 1983 it had fallen back to 14.2 percent.

6. The term "liner" refers to a ship that operates as a common carrier on a regular route with a published schedule and published freight rates. Liners typically carry a heterogeneous cargo on any given voyage--whatever shippers need transported and the ship can handle. Today liners are usually containerships. "Bulk carriers" carry non-differentiable cargoes such as grain, ore, or crude oil, usually in shipload lots and usually by charter hire for a single shipper.

Figure 1.

U.S.-Flag Ship Participation in U.S. Oceanborne Foreign Trade, 1920-1980

SOURCE: Congressional Budget Office.

TYPES OF CARGO SHIPS

Liners. Ships that operate as common carriers on regular routes with published freight rates. They normally carry diverse cargoes and their services are available to all shippers. The trend in liner operations is toward containerships and away from breakbulk ships.

Bulk Carriers. Ships that carry homogeneous, unpackaged cargoes, usually in ship-load lots. Cargoes include dry bulk commodities such as grain or ore and liquids such as crude oil and petroleum products.

Breakbulk Ships. Traditional, multipurpose freighters that carry nonuniform items in general purpose holds. This method of carriage results in labor-intensive loading and offloading.

Containerships. Ships designed to carry cargo in standard size preloaded containers. This permits rapid loading and offloading and efficient transportation of cargo to and from the port area.

Roll-on/Roll-off Ships (RO/RO). Ships designed to permit trucks, trailers, and other vehicles to drive on and off for transport of cargo by water.

LASH--Lighter Aboard Ships. Ships designed to carry cargo in barges that are taken aboard and discharged at ports of call. This reduces ship time lost in loading and offloading cargo and allows large ships to service shallow-water ports.

Tankers. Generic name for ships that carry liquid cargoes.

Crude Carriers. Tankers that carry crude oil.

Product Tankers. Tankers that carry refined petroleum products.

Dry Bulkers. Bulk carriers that carry dry bulk commodities.

Oil, Bulk, Ore Ships (OBO). Ships designed to carry a combination of bulk commodities.

LNG or LPG Ships. Special purpose ships designed to carry liquified natural gas or liquified petroleum gas.

Self-Sustaining and Non-Self-Sustaining Ships. Ships either capable of loading and off-loading their own cargo or not capable of doing so, respectively.

petroleum for the Strategic Petroleum Reserve, are reserved for U.S.-flag ships.

Government financing programs can be very helpful in raising the large amount of capital required to build a merchant ship. A typical arrangement is the sale and lease-back plan through which a ship operator orders a ship from a U.S. shipbuilder, but rather than pay for it directly, arranges for a financial institution to buy the ship which he then leases. Limited partnerships are now also formed for this purpose. Since up to 87.5 percent of the purchase price is guaranteed by the government, it is a safe investment for the financiers who can subsequently reduce their taxes through accelerated depreciation. The remaining 12.5 percent is financed with the investment tax credit, initial depreciation, and, if available, funds from the capital construction fund (CCF). The key to this happy arrangement, however, is the prospect of profitable operations over the term of the lease. If an operator has a good chance to continue to earn revenues from his operations, financing his ships should not be a problem. Indeed, this ability to mobilize capital is one of the enduring strengths of the United States in maritime enterprises.

In summation, the United States retains a substantial but aging merchant fleet. Aided by various kinds of direct and indirect government supports, but burdened by high crew and capital costs, the U.S.-flag fleet is struggling to maintain a presence in world shipping. This struggle has been most successful in the liner trades in which U.S.-flag ships carry over one-fourth of U.S. international trade. In the more competitive bulk trades, however, U.S.-flag ships retain only a token presence, except on domestic routes where they are protected by cabotage. In order to compete, ship owners must procure their ships at lower foreign prices and man them with lower-wage foreign crews. Responding to this reality, many U.S. shipowners register their ships abroad and the number of U.S. privately owned ships registered abroad now exceeds those registered in the United States. The national security aspects of the merchant marine are enhanced not only by having U.S. ships registered in the United States and manned by American crews, but also by having the fleet include a substantial number of ships with characteristics that are useful for military support operations, characteristics that are, unfortunately, increasingly at odds with commercial efficiency. These points bear on national maritime policy considerations, which are discussed in Chapter IV.

THE U.S. SHIPBUILDING INDUSTRY: CURRENT STATUS AND PROSPECTS

The U.S. shipbuilding industry enjoys a long and proud tradition dating from early colonial times. It has provided the merchant hulls, from clippers

to containerships, that have carried the waterborne commerce of a maritime nation through two centuries of unparalled economic growth. American shipyards also have produced the warships that protected this commerce and guarded U.S. interests around the world. Now this industry is in trouble. It is widely agreed that the shipbuilding industry--or more precisely that segment producing oceangoing merchant ships--cannot meet foreign competition and will shrink substantially unless it receives more government support. This lack of competitiveness is primarily a result of fundamental economic realities, and is a plight shared by the shipbuilding industries in many other industrially mature nations.

U.S. Shipbuilding in the World Market

In terms of total industry employment and available facilities, the United States currently has the largest shipbuilding industrial base in the world, with the possible exception of the Soviet Union. The total U.S. shipbuilding and ship repair industry consists of nearly 700 facilities but most are very small. Within this total, the "shipyard mobilization base" contains about 110 shipyards, including nine government-owned shipyards (eight Navy and one Coast Guard). Of the total 237,756 workers employed in the industry at the end of 1982, 158,500 were in the private sector and 79,256 were in public yards. 7/

Currently, the private sector constructs all new ships for the Navy and government-owned shipyards concentrate on overhaul and repair. Naval shipyards retain the specialized skills and large technical staffs that are necessary for maintaining and overhauling complex warships. They normally undertake about two-thirds of all naval repair, overhaul, and conversion work, with private facilities performing the other one-third. 8/

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7. Department of Defense, Annual Report on the Status of the Shipbuilding and Ship Repair Industry of the United States, 1982: Coordinator of Shipbuilding, Conversion and Repair, Reports Control Symbol DD-IEL(A)1141 (July 1983), p. 1-1.

8. At one time, naval shipyards engaged in new construction as well but since 1967 government policy has been to allocate all new construction to private yards. An important distinction among shipyards doing Navy work is the capability to work with nuclear reactors. Reactor work requires a facility certification by the Department of Energy through the Navy's Nuclear Propulsion Directorate. Currently, two private shipyards (General Dynamics Electric Boat Division and Newport News Shipbuilding and Drydock Co.) and six naval shipyards

TABLE 9. ACTIVE U.S. SHIPBUILDING BASE, BY REGION, DECEMBER 1982

	Total Plant Employees	Total Production Workers
Atlantic Coast		
Bath Iron Works	8,464	7,467
Bethlehem Steel, Sparrows Point	809	545
General Dynamics, Electric Boat Division	24,550	21,317
General Dynamics, Quincy SB Division	2,285	1,491
Maryland Shipbuilding & Drydock	912	726
Newport News Shipbuilding	25,983	19,688
Norfolk Shipbuilding & Drydock	3,810	3,525
Pennsylvania Shipbuilding Co.	850	587
Total	67,663	55,346
Gulf Coast		
Alabama Dry Dock & Shipbuilding	127	101
Avondale Shipyards	5,659	4,313
Bethlehem Steel, Beaumont	700	514
Equitable Shipyards	150	100
Halter Marine Services	1,526	1,131
Ingalls Shipbuilding Division	10,126	7,994
Levingston Shipbuilding	612	462
Tampa Ship Repair & Dry Dock	454	375
Todd Shipyards, Galveston	517	325
Todd Shipyards, Houston	293	203
Subtotal	20,164	15,518
Pacific Coast		
Lockheed Shipbuilding and Construction Co.	3,253	2,611
National Steel & Shipbuilding Co.	4,948	3,781
Tacoma Boatbuilding Company	2,500	2,075
Todd Pacific Shipywards, Los Angeles Division	3,650	3,196
Todd Pacific Shipyards, Seattle Division	4,037	2,399
Total	18,388	14,062
Great Lakes		
American Ship Building, Lorain	183	83
Bay Shipbuilding	683	519
Marinette Marine Corp.	591	422
Peterson Builders, Inc.	573	457
Total	2,030	1,481
Total Active Shipbuilding Base	108,245	86,407

SOURCE: Maritime Administration.

Among the many U.S. shipyards, only a small portion can build large oceangoing ships. The Navy and Maritime Administration use the term "active shipbuilding base" to designate a group major shipyards that are building or can build naval or major merchant ships. In December 1982, this group consisted of 27 yards, with a total employment of 108,245 workers. The bulk of naval construction work, however, is usually concentrated in only about five or six of these yards. The rest of the yards in the active shipbuilding base and the smaller shipbuilding and repair facilities provide the expansion capacity that previous experience and current defense planning indicate would be needed in wartime--an important national security consideration.

Maintaining this industrial base will require a continuing demand for its products, a condition now subject to doubt because of unfavorable competitive trends.

Current U.S. Shipbuilding: Competitive Factors

Commercial Ship Construction. Currently the U.S. shipbuilding and repair industry does not compete effectively with foreign shipyards because of generally higher labor and material costs and lower productivity in the United States. The shipbuilding process resists many of the industrial innovations that have been so successful in other industries. Ships normally cannot be mass-produced because of low unit demand. While automobiles of a given type are produced by the hundreds of thousands and airplanes by the hundreds, it is unusual for production of any one ship design to extend beyond ten units in the United States. Ships, therefore, tend to be tailor-made products, produced by skilled craftsmen without the aid of the labor-saving, production-line techniques that higher volume might justify. When there are opportunities for multiple-unit production runs, however, significant efficiencies can be achieved as experience is gained (called "learning curve efficiencies" in economic jargon). This was vividly illustrated by U.S. experience in the production of Liberty and Victory ships in World War II and has been a factor in the efficiencies realized more recently by foreign shipbuilders.

This does not mean that the shipbuilding industry in the United States has been devoid of technical improvements. Impressive advances have been made, including greatly improved welding techniques, modular construction methods, semiautomatic assembly of piping and structural members, and

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(Portsmouth, Norfolk, Charleston, Puget Sound, Mare Island, and Pearl Harbor) are qualified to work on nuclear-powered ships.

TABLE 10. SHIPYARD COST COMPARISONS

Costs	United States	Japan	Europe
Wages (Index numbers)	100	74	83
Man Hours Per Ship (Index numbers)	100	46	57
Steel Prices (In dollars per ton)	535	386	331-353

SOURCE: Raymond Ramsay, "New Directions for Navy Manufacturing and Shipbuilding Technology," Naval Sea Systems Command, Addendum to Proceedings, Eighth Ship Technology and Research Symposium, The Society of Naval Architects and Marine Engineers, Washington, D.C. (April 8, 1983).

computer-based control methods, to name only a few. Nevertheless, the nature of the product and the inherent low unit volume make shipbuilding a labor-intensive process.

Some index numbers comparing shipbuilding factors in the United States, Japan, and Europe are shown in Table 10. The lower productivity of U.S. shipyards, as indicated by man hours per ship, results from generally older facilities and the lack of series production opportunities. In shipbuilding, success tends to breed more success--that is, sufficient orders for ships of a given type can lead to series production which leads to lower costs which leads to still more orders. A shipyard with few orders, on the other hand, cannot realize the benefits of multiple-unit production, which results in higher costs and continued slack demand. The U.S. shipbuilding industry is now stuck in this adverse cycle, resulting in uncompetitive prices for U.S.-built ships. In addition, some evidence exists that the slack world market for ships during the past several years has caused some foreign shipyards to bid below costs in order to secure needed work. This has tended further to widen the price spread. 9/

9. See Alan Jenks and John E. Lainer, "A Tanker Owner's Perception of New Building Costs and Prices in Japanese, North European and United States Shipyards 1971 to 1981," Proceedings of the 1982 Ship Cost and Energy Symposium, The Society of Naval Architects and Marine Engineers, New York (1982).

TABLE 11. MERCHANT SHIP ORDERS AWARDED TO U.S. SHIPYARDS, 1973-1983 (For ships of 1,000 gross tons and over)

Calendar Year	Total Number of Ships	Gross Tonnage
1973	41	1,978,000
1974	15	1,113,300
1975	11	507,900
1976	16	339,400
1977	13	265,500
1978	30	394,000
1979	21	487,200
1980	7	116,200
1981	8	148,000
1982	3	19,900
1983	0	0

SOURCE: Department of the Navy, Annual Report on the Status of the Shipbuilding and Repair Industry of the United States (1982). The 1983 data is from the Shipbuilder's Council of America.

The result of this state of affairs is, not surprisingly, that demand for merchant ships from U.S. shipyards has been low. Table 11 displays merchant ship orders awarded to U.S. yards in the 1973-1983 period. The economic disruption following the oil embargo in 1973 severely dampened demand for shipping here and abroad. For part of this period, orders for offshore oil drilling rigs, which are also produced in shipyards, offset some of the slack demand for ships; but currently demand is low for both ships and drilling rigs.

Naval Ship Construction. U.S. shipbuilding performance improves, relative to foreign yards, as the complexity of the ships produced increases. U.S. shipyards perform best in the design and construction of complex warships. Although Japanese shipyards typically deliver merchant ships in significantly less time than U.S. yards, the construction time for a frigate of moderate complexity is likely to be about the same, or less, in U.S. yards. In the most complex ship types, such as aircraft carriers and nuclear submarines, the United States has capabilities and experience that are unmatched anywhere.

One of the most important and troublesome realities about modern warships is their very high cost. Shipyards, with their alleged inefficiencies, are often blamed for this high cost. To gain a perspective on this issue, however, one must consider the components of the cost of a warship. For a typical Navy destroyer, the hull and machinery--the parts produced in the shipyard--represent only about one-third to one-fourth of the total cost of the ship; the rest pays for combat systems and other program costs. Moreover, the shipyard's manufacturing costs are only about one-third of its costs (the rest is accounted for by materials, engineering, and management overhead). Thus, even if manufacturing costs were halved through productivity improvements, which would be a great industrial achievement, the total cost of the ship would be reduced by only about 4 to 5 percent. Shipyard manufacturing productivity improvements, however important they may be in other respects, are not the key to substantial reductions in warship costs. For that, it would be better to look at combat systems which represent a much larger portion of the total cost.

U.S. Shipbuilding: Prognosis

In the foreseeable future, it can be expected that the Navy will have about 80 to 100 ships on order and under construction at any given time. Naval new construction work occupied about 36 percent of the private-sector shipbuilding work force as of the end of 1982 and should remain at about that level in the immediate future. Naval overhaul and repair work occupies about 20 percent of the private and all of the naval shipyard work force. For fiscal year 1984, $11.4 billion was appropriated for the Shipbuilding and Conversion, Navy (SCN) account and budgets as high as $21.6 billion are projected in the Administration's five-year shipbuilding plan. (As discussed above, however, all of this does not go to the shipbuilding industry.) In addition, private shipyards should continue to receive over $2 billion annually for overhaul and repair work on naval ships.

In view of current trends, the Navy's role as primary customer for the industry should continue. The Navy and the Maritime Administration project a decrease in the shipbuilding industry work force of as much as 25 percent by the late 1980s if the present famine in commercial business continues--a decline that raises questions about the ability of the industry to meet wartime mobilization requirements, if required. This is addressed in the next chapter.

CHAPTER IV. SHIPPING, SHIPBUILDING, AND NATIONAL SECURITY

Many nations have long regarded their shipping and shipbuilding industries as important to their national security. The national security consideration has been an important determinant in the decisions of numerous countries to award subsidies and other forms of support to their maritime industries. Nowhere has this been truer than in the United States, which has supported its maritime industries since the earliest days of the nation.

Recent studies by the Department of Defense (DoD) and the Navy and Maritime Administration indicate that the U.S.-flag cargo fleet and U.S. shipbuilding industrial capacity projected for the late 1980s may be inadequate to provide necessary wartime sealift when assessed against the requirements of current military contingency planning. 1/ The U.S. shipbuilding industry has considerably more than adequate capacity to meet current peacetime demand, but the industry base is shrinking for lack of orders for commercial ships. Employment in the shipbuilding industry is now below the level that the Navy believes would be needed in the opening phase of a defense mobilization and further contraction seems likely if commercial demand does not increase.

SHIPPING AND NATIONAL DEFENSE

Both a review of history and thoughtful consideration of present international conditions suggest that cargo shipping is vital to U.S. national security. Separated from trading partners and allies by long ocean routes, the United States relies on shipping to sustain its economy and to support almost any kind of military operation.

The Role of Shipping in Wartime

Since Revolutionary days, shipping has played a vital role in every war that the United States has fought. In both World War I and World War II, the

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1. Department of Defense, Office of the Director, Program Appraisal and Evaluation; DoD Sealift Study (March 1984). Department of the Navy, Office of the Assistant Secretary (Shipbuilding and Logistics), and Department of Transportation, Maritime Administration, Shipyard Mobilization Base (SYMBA) Study (processed, February 1984).

federal government underwrote vast emergency programs to build cargo ships and the factors that motivated these massive efforts have not changed in the intervening years. U.S. allies are no closer now than they were then, and the United States is more, not less, dependent on overseas trade. The development of nuclear weapons has, of course, raised the awesome possibility of an enormously destructive short war in which cargo shipping, like nearly everything else save nuclear missiles, would be irrelevant. In conflicts short of nuclear war and in maintaining a posture that will deter nuclear war, however, cargo shipping will remain vital.

In wartime, shipping is required for all the purposes it serves in peacetime, plus the many additional demands imposed by support of military operations. These include:

- Transporting military equipment and personnel from the continental United States (or other location) to the area where the military unit is to be employed;

- Providing a continuing flow of supplies to support military operations in the field; and

- Providing logistical support for naval forces at sea or at overseas bases.

Military support is normally given first shipping priority, but sustaining basic economic activity is also vital to a successful war effort. Indeed, an economic blockade has been a classic and often effective strategy in past wars. In World War II, the Germans came close to knocking Britain out of the war with their submarine campaign in the Atlantic; in the Pacific, Japan was severely weakened by the damage done to its shipping by American submarines.

Perhaps the best evidence for the importance of shipping in wartime is the experience of past wars. It has been estimated that two tons of shipping capacity were needed continuously at sea to support one soldier in France in World War I. By World War II, when weapons and equipment had grown bulkier, this had increased to about eight tons for a soldier in Europe and twice that for a soldier in the vast Pacific theater. Between Pearl Harbor and the end of the war, the United States shipped 268,252,000 long tons of cargo and over seven million troops, with over 75 percent transported on U.S.-flag ships. 2/ Today weapons and equipment are even more bulky and

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2. Robert A. Kilmax, ed., American Maritime Legacy: A History of the U.S. Merchant Marine and Shipbuilding Industry Since Colonial Times (Boulder, Colorado: Westview Press, 1979), p. 204.

almost all military planners agree that most war materials would be sent to overseas theaters in ships. At issue is whether these need to be American-flag ships.

Although total dependence on foreign shipping might serve the United States well in peacetime, relying on foreign-flag ships for wartime service seems a much riskier proposition, especially so for direct support of military operations. It might be desirable to have enough U.S.-flag shipping to sustain normal trade in wartime, but attempting to achieve such a level is probably not realistic. (The United States now depends upon foreign-flag shipping for about 94 percent, by weight, of its oceanborne commerce.) What is more achievable--and more important--is having enough U.S.-flag ships with American crews to undertake direct military support functions. Although it is conceivable that foreign-flag ships could be chartered for these duties, wartime operations would almost certainly involve considerable danger. In World War II, about 700 U.S. merchant ships were sunk and about 5,600 U.S. merchant seamen lost their lives, a loss rate of 2.8 percent which was exceeded only by the 2.9 percent loss rate of the U.S. Marine Corps. 3/ Many believe, therefore, that it would clearly be risky to depend on foreign shipowners or foreign crews for dangerous operations vital to a U.S. war effort. If the United States is to control its sealift capabilities, it needs a certain number of cargo ships, owned and crewed by Americans, that would be available and suitable to support military operations.

Strategic Lift: Airlift vs. Sealift

Airlift cannot meet these military needs. The relationship of airlift and sealift in a general sense is illustrated in Figure 2. Airlift can respond very rapidly and, given access to airport facilities, can deliver a limited amount of cargo in a short time. Sealift requires much more time to reach its destination but can carry vastly more cargo. Once mobilized, sealift will carry about 95 percent, by weight, of all military cargoes and over 99 percent of fuels and lubricants. A single cargo ship, with a moderate capacity of about 8,000 tons, can carry more cargo than the single-day capacity of the entire U.S. intertheater airlift fleet--including military and Civil

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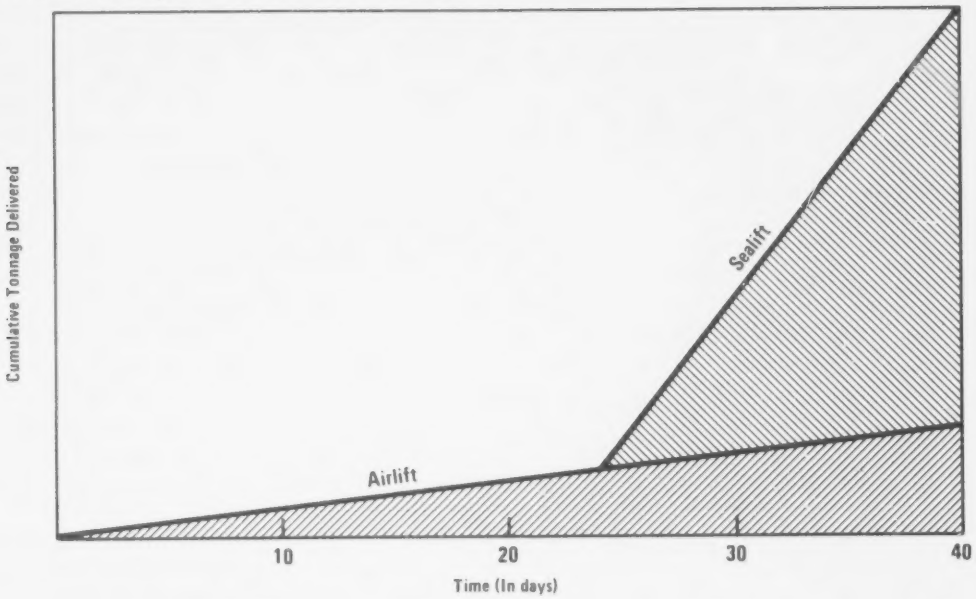
3. Jesse M. Calhoon, President, National Marine Engineers Beneficial Association, testimony before the Seapower and Strategic & Critical Materials Subcommittee of the House Armed Services Committee, 98:1 (April 25, 1983).

Figure 2.

Relationship of Airlift and Sealift



Reserve Air Fleet (CRAF) aircraft. 4/ Although airlift is important for putting forces in place quickly, sealift will, for the foreseeable future, carry the bulk of military cargo. 5/

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4. The current intertheater airlift fleet contains 70 C-5, 234 C-141, and 67 Civil Reserve Air Fleet (CRAF) aircraft. CBO estimates that the sustained lift capability of this fleet is about 4,000 tons per day to southwest Asia from the continental United States. Currently programmed aircraft procurement would increase this to 114 C-5s, 234 C-141s, and 41 KC-10s by 1990. The enlarged fleet will have a sustained capacity of about 6,800 tons per day to Southwest Asia.

5. Another aspect of strategic mobility is prepositioning. This means that the equipment for a body of troops is stored in the vicinity of the expected conflict, either on land or, as in the case of the Rapid Deployment Joint Task Force, on ships. With equipment prepositioned, forces can be deployed much more rapidly, assuming, of course, that the conflict occurs in the area where the equipment is stored. Upon mobilization, the designated military units are assembled at their U.S. bases and then airlifted to the prepositioning site. At the site, equipment and personnel are joined and the mobilized unit moves to

TABLE 12. EQUIPMENT FOR A TYPICAL MECHANIZED MODERNIZED ARMY DIVISION

Item	Number of Items
M1 Tanks	290
Bradley Fighting Vehicles	370
155mm Howitzers	72
8-Inch Howitzers	12
Multiple Launch Rocket System	12
Division Air Defense Guns	36
Chaparall Air Defense Launchers	18
Trucks, 5-Ton	456
Trucks, 2-1/2-Ton and Smaller	1,264
Attack Helicopters (AH-64)	36
Utility Helicopters (UH-60)	23
Total	2,581

SOURCE: Congressional Budget Office.

Transporting major military units overseas is a formidable task. The equipment associated with a single typical mechanized division is shown in Table 12. Thousands of major items of equipment and countless minor items total nearly 100,000 tons for some fully supported divisions. Transporting material for a division of this size would require about eight relatively large modern cargo ships, assuming some modification for military equipment, or as many as 35 unmodified ships. 6/ Moving this much equipment by air would require almost a month even if the entire airlift fleet was devoted to this task.

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the actual combat area. In this case, as in cases in which prepositioned equipment is not available, sealift is necessary to provide sustained logistical support and reinforcements for the deployed forces.

6. The modification is installation of "sea sheds" and "flat racks" that enable containerships to carry more efficiently the larger items of equipment required by Army units. Sea sheds are basically triple size (25 feet by 40 feet) containers that enable containerships to carry tanks and other large vehicles and equipment. Flat racks are standard size containers without walls that add further cargo flexibility.

Current Distribution of Mobility Funding in the Department of Defense

Despite the importance of sealift, current Department of Defense budgeting for airlift and sealift programs allocates 97 percent of funds to airlift programs. Table 13 contains a summary of airlift/sealift budgets (as contained in the DoD Annual Report to the Congress for Fiscal Year 1985). Clearly the allocation of resources is tilted heavily toward airlift programs although sealift would carry over 95 percent of the weight in time of war. Indeed, it is interesting to note that the allocation of funding between airlift and sealift is in almost the reverse proportion of their lift capacity.

Capability Requirements for the U.S.-Flag Fleet

If one accepts the continued need for U.S.-flag sealift, it remains only to define the numbers and types of ships necessary to support possible future U.S. military operations in order to arrive at a "requirement" for military sealift. Unfortunately, this could be done precisely only with exact knowledge of future events, including when and where the conflict would occur, what U.S. forces would be used, what enemy forces would be encountered, what allied forces would contribute, and what losses would be sustained. Since this information is clearly unavailable in advance, all stated requirements can be, at best, only educated guesses. Estimates can vary widely depending upon the "scenarios" and other assumptions used in the analysis.

The Department of Defense has attempted to estimate U.S. sealift requirements on several occasions in the past. The most recent estimate, entitled the DoD Sealift Study, was completed in early 1984. In contrast with earlier mobility studies that tended to focus on airlift and prepositioning requirements, the DoD Sealift Study concentrates primarily on sealift. Using an assumed scenario based on a worldwide war with concurrent operations in Europe, Northeast Asia, and Southwest Asia, it derived "surge" and "sustaining" sealift requirements in terms of weight capacity. The surge demand is associated with the movement of forces required in the combat theater early in the conflict. Sustaining demand includes follow-on forces and continuing resupply and ammunition.

The Department of Defense policy objectives for meeting military cargo sealift requirements are:

- At a minimum, to maintain sufficient shipping capacity under U.S. government control and/or in the U.S. commercial fleet to meet the surge and sustaining requirements of that portion of a global war wherein allied shipping is not available. (The U.S. commercial fleet includes ships registered under U.S. flag and effective U.S. controlled ships owned by U.S. citizens and registered under foreign flags of convenience.)

TABLE 13. DoD FUNDING FOR AIRLIFT/SEALIFT PROGRAMS
(By fiscal years, in millions of dollars)

Airlift/Sealift Programs	Actual 1983	Planned 1984	Proposed 1985	Proposed 1986
Airlift				
C-5 procurement	798.9	1,367.1	2,189.8	2,568.8
KC-10 procurement	891.3	742.0	647.0	507.0
CRAF enhancement	0	95.9	128.9	253.6
C-5 wing modification	184.6	241.6	0	0
C-17 development	60.0	26.6	129.3	364.2
Subtotal	1,934.8	2,473.2	3,095.0	3,693.6
Sealift				
SL-7 program	44.0	227.0	2.2	9.7
Ready Reserve fleet	0	31.0	31.0	31.0
Containership utilization	10.2	17.3	18.5	56.3
Crane ships (TACS)	0	29.8	44.0	71.0
Sealift discharge	5.0	34.0	87.1	136.4
Subtotal	59.2	339.1	182.8	304.4
Total	1,994.0	2,812.3	3,277.8	3,998.0
Percent Distribution				
Airlift	97	88	94	92
Sealift	3	12	6	8

SOURCE: Congressional Budget Office based on data from Department of Defense, Annual Report to the Congress for Fiscal Year 1985 (February 1, 1984).

- To obtain shipping assistance from U.S. allies to meet U.S. military surge and sustaining requirements in respective allied geographic areas.

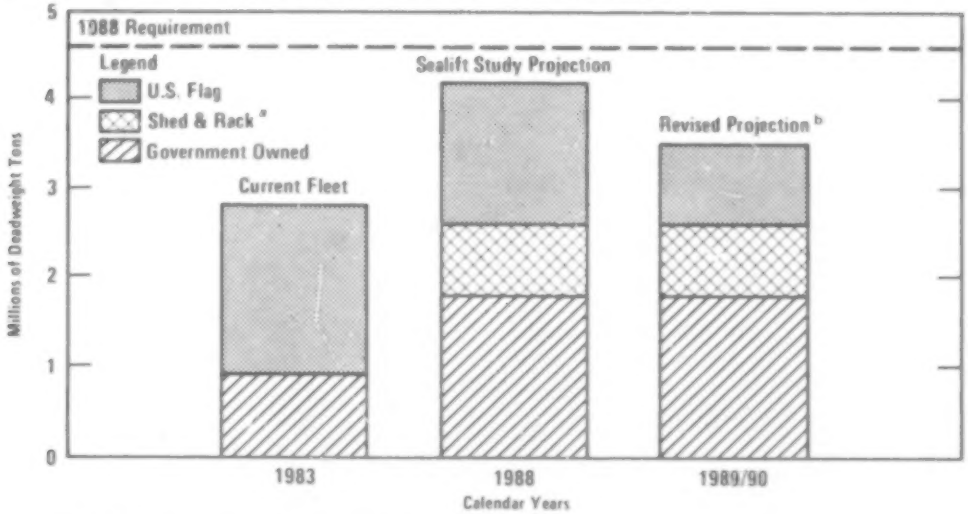
Although the details of the DoD Sealift Study are classified, the summary findings have been released. The key deficiencies identified were shortages in dry cargo ships capable of carrying unit equipment (UE)--tanks, trucks, howitzers, and so forth--in the surge phase of a mobilization. DoD's assessment of tankers, as opposed to dry cargo ships, is still in progress and has not been released. The study assumed, as current DoD planning assumes, that the U.S. would rely on shipping from the NATO and Northeast Asian allies to meet U.S. military surge and sustaining requirements in their respective geographic areas. U.S. shipping would be used exclusively for deployments to Southwest Asia, where the study estimated requirements to move about 800,000 short-tons of military unit equipment during surge operations and about 1.7 million short-tons of resupply and ammunition during sustaining operations. Delivery of that amount of cargo on time would require about 4.6 million deadweight tons of shipping for surge and 3.3 million deadweight tons for sustaining operations.

A summary of surge shipping requirements versus existing and projected capabilities is displayed in Figure 3. This shows that the dry cargo fleet actually available in 1983 was assessed to have a capability of only about 61 percent of that required by 1988. Sealift enhancement programs being undertaken by the Administration were projected to improve the capacity of the fleet to about 90 percent of the requirement by 1988, principally through acquisition of additional government-owned ships and procurement of "sea sheds" and "flat racks" to improve the capability of existing ships to carry unit equipment (see footnote 6). That projected capacity is represented by the middle bar of Figure 3 and is the basis for the conclusion of the Sealift Study that U.S. shipping capacity would be "marginally inadequate" in 1988 for anticipated surge requirements. More recent Maritime Administration projections of the U.S.-flag cargo fleet, however, are less optimistic about the commercial capacity that will be available in the late 1980s. The third bar in Figure 3 represents this more recent assessment with a 24 percent deficiency in capacity. If this later projection of commercial fleet capacity is borne out, then the deficiency would become more than marginal.

It is possible that these assessments of capacity deficiencies are overstated. The scale of a future conflict might be less than that assumed, and/or its beginning might be more drawn out, allowing more time for ships to transport needed supplies and equipment. Also, the pace of the war could be slower than assumed in the study and the United States might be able to obtain even more shipping support from other countries.

Figure 3.

Available Shipping Versus Requirement: Department of Defense Estimate for Deployment of Military Unit Equipment During Surge Phase of Mobilization



SOURCES: Department of Defense and Maritime Administration.

[a] Sea shed and flat rack are devices to improve the ability of existing containerships to carry military unit equipment.

[b] Revised projection is contained in a more recent assessment by the Maritime Administration.

On the other hand, it is at least equally plausible that these estimates are optimistic. It is quite possible that certain assumptions made in the DoD study--warning time before hostilities, the ability of allies to support all sealift to Europe and Northeast Asia, and the willingness of foreign-flag ships to carry all U.S. economic support cargoes in wartime--would not be realized in an actual conflict. In addition the experience of previous wars and simple prudence suggest that the United States can expect attrition of its cargo fleet, perhaps to a greater extent than the study assumes. The "requirements" and "deficiencies" identified in studies such as this are only informed estimates, not immutable truths.

CBO Assumptions

CBO has not attempted to offer an independent assessment of the wartime requirements for shipping. These requirements depend upon com-

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plex judgments about the probable scope and pace of future conflict and are intimately related to broader force planning issues that are properly the province of the Department of Defense. Nor can CBO more accurately forecast the state of the shipping market, which will influence the size of the commercial fleet. This study, therefore, accepts the results of the DoD Sealift Study as the best and most authoritative definition of U.S. sealift requirements for national security.

The militarily useful U.S.-flag cargo fleet in 1983, as identified in the DoD Sealift Study, numbered 654 ships, active and inactive, including 467 dry cargo carriers and 187 tankers. The fleet projected for 1988 (original projection, middle bar in Figure 3) has decreased in number to 635 ships (468 dry cargo and 167 tankers) but has increased capacity from about 60 percent in 1983 to 90 percent of required capacity for the dry cargo portion of the fleet, including the effect of enhancement with sea sheds and flat racks.

Although it is cargo capacity and, more specifically, militarily useful capacity, that is central for assessing sealift, the number of ships in the fleet is also an important consideration as a rough proxy for capacity and as an indicator of the fractionation and flexibility of the fleet. The capacity of a typical oceangoing cargo ship has risen steadily over the years but, as stated earlier, very large ships are less useful militarily and inevitable loading and scheduling inefficiencies limit the amount of available capacity that could be actually used.

In very broad terms it appears that a fleet of about 600 militarily useful cargo ships, with about the current mixture of ship types but with improved cargo capacity, stowage, and handling capabilities, could sustain currently envisioned military support requirements, but with little margin for attrition and economic support cargoes. To maintain a fleet of this size, assuming a 30-year ship life, would require an average input of 20 ships per year. The ships procured would, of course, have to be militarily useful to meet national security objectives.

SHIPBUILDING AND NATIONAL DEFENSE

Although the shipbuilding industry is not the only industrial sector that is vital to sustaining naval and merchant shipping, it is the center of the many activities required to create or overhaul ships. While many other industries supply the multitude of items that make up a modern ship--indeed, the value added by the shipbuilder is less than half the total cost of a warship--shipyards assemble the final product and as a result, are the focus of concern about the health of the industrial base that supports U.S. naval and maritime resources.

FUNCTIONS OF THE SHIPBUILDING INDUSTRIAL BASE

PEACETIME REQUIREMENTS

Ensure that Navy ships can be maintained in a high degree of material readiness and modernized with appropriate new equipment.

Retain enough capability to maintain or increase the size of the naval fleet and to build and maintain merchant ships consistent with the objectives of the Merchant Marine Act of 1936, as amended.

WARTIME REQUIREMENTS

Be able to support wartime needs for overhaul, repair, and battle damage repair.

Provide the capability to build additional naval and cargo ships and support a merchant marine needed for a war or national emergency.

The Role of Shipbuilding in Wartime

The U.S. shipbuilding industry expanded enormously when the United States mobilized for World Wars I and II. The importance of seapower and sealift are no less important today, and the shipbuilding industrial base, therefore, retains its importance for wartime mobilization.

The functions of the shipbuilding industrial base, as defined by the Navy and Maritime Administration, are shown in the accompanying box. The first two functions focus on support of the peacetime fleet while the last two deal with mobilization requirements in wartime. There is little doubt that the shipbuilding industry has, and will continue to maintain, the capability to perform the first two functions. It is the last two, the wartime mobilization functions, that are the cause of concern.

It is, of course, conceivable that these industrial support functions could be performed abroad. Warships can be procured abroad and overhauled and modernized in foreign shipyards. Many countries with limited capabilities for building modern warships in fact do precisely that. This practice, however, makes the purchasing nation dependent upon the tech-

nology and logistical support of the vendor nation. For this reason, and because the U.S. continues to have the world's most advanced warship design and construction capabilities, most defense planners believe it would be unwise for the United States to procure its warships abroad. 7/ This same argument requires that an American-built Navy be supported by American resources for overhauls and repairs.

In the case of merchant ships, however, the arguments are less clear. The United States now relies on foreign ships to carry over 94 percent of its oceanborne trade and will probably remain dependent on foreign shipping for economic support in peacetime. Foreign shipyards now offer much more attractive prices for both ship construction and repair, and there is little prospect that this will change. To the extent that new technology is important in merchant ship construction, foreign yards are sufficiently up-to-date. Furthermore, satisfactory maintenance can probably be obtained in foreign yards as quickly as in the United States--and for a lower price.

The problem comes in time of war. Overseas shipyards may not be accessible for a variety of physical, political, or military reasons. In these circumstances, only national resources can be relied upon to support the merchant marine. Maintenance of an industrial capability to provide for such a contingency, therefore, can be viewed as a matter of national security readiness, just like other national security needs. And, as with many other such needs, it can be expensive.

Shipyard Capacity for Mobilization Needs

The key question, then, is how much industrial capability is required to support national security needs, and the answer, as in most other security issues, is that more is always better. This question, like that of cargo ship requirements, is the subject of a recent report, the Shipyard Mobilization Base (SYMBA) Study. 8/ Although that study has not been published as of

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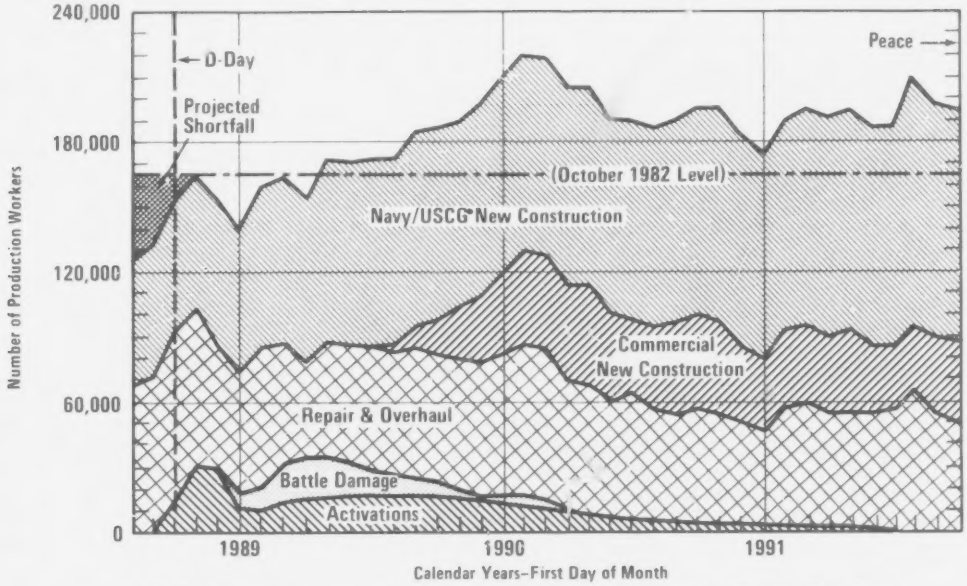
7. This does not mean that it might not be desirable to procure foreign-built components, systems, or even ships if other nations have developed effective items.

8. Department of the Navy, Office of the Assistant Secretary (Shipbuilding and Logistics) and Department of Transportation, Maritime Administration, Shipyard Mobilization Base (SYMBA) Study (processed, February 1984). This is the most current and authoritative guide to shipyard capacity requirements now available. As was the case with shipping requirements, CBO cannot make an independent assessment of shipbuilding capacity requirements for wartime mobilization since

Figure 4.
Shipyard Workload



SOURCE: Navy Department and Maritime Administration, *Shipyard Mobilization Base Study* (forthcoming).

NOTE: Shaded area on left-hand side of figure denotes a potential shortfall of 40,000 production workers as mobilization begins.

this writing, CBO has received some preliminary results. This information is summarized in Figure 4.

The SYMBA study, a cooperative effort by the Navy and the Maritime Administration, considers a global conflict of relatively long duration (three years) beginning in 1988, and is based on scenario assumptions similar to those of the Sealift Study. Figure 4 portrays the demand and general nature of the activity in the shipbuilding industry that would be generated by this scenario. Examination of the figure provides an insight into the evolution of activities as the assumed conflict progressed. Immediately before and after D-day, intense activity would result from the activation of reserve ships, both Navy and merchant marine. Ongoing Navy/Coast Guard construction and repair work would continue and would accelerate under the impetus of

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that involves broader force planning issues that are the responsibility of the Department of Defense.

the emergency. In addition repair work after D-day would increase as a result of battle damage. Starting about ten months after D-day, there would be a steady increase in new construction, almost entirely accounted for by commercial shipbuilding.

The shaded area on the left-hand side of Figure 4 represents a potential shortfall of about 40,000 production workers at D-day. That is the difference between the study's estimate of the 165,000 production workers needed for the total workload as the war began and the 125,000 whom the study estimated would be actually available solely as a result of Navy work at that time. (Note that the study assumes a continuation of the current lack of commercial ship orders.) It is this potential shortfall of workers that constitutes the key deficiency identified by the SYMBA Study. If one accepts the validity of this finding, then the shipyard work force should be fully one-third larger than just Navy work would support in order to deal with the workload that would be imposed upon mobilization. If the work force is insufficient, then the mobilization will take longer.

It is possible, of course, that the potential capacity shortfall is overstated or that it would not occur. Although the decline in the work force seems likely to continue, it is improbable that there would be no commercial work at all for the industry. In time, the shipbuilding industry may develop its own additional business without increased government support. Even if the industry does shrink below the preferred employment levels identified in the SYMBA Study, it is possible that mobilization tasks could be accomplished by better management of resources, including such possibilities as temporarily interrupting construction of some new ships early in the mobilization in order to concentrate on reactivations and repair of battle-damaged ships. Greater use of foreign shipyards than assumed in the SYMBA Study might relieve pressure on domestic resources. Finally, a conflict of the scale assumed in the study might never occur.

On the other hand, the growth in the shipbuilding work force requirement projected by the SYMBA Study is much more modest than that which occurred in World War II. The study projects a peak force of about 220,000 production workers, a growth of 33 percent over the 165,000 workers needed on D-day and 76 percent over the 125,000 workers estimated to be actually available, in the absence of commercial work, just before D-day. In World War II, total shipyard employment increased 10-fold between mid-1940 and the employment peak in mid-1943, a much more drastic mobilization than is projected by the SYMBA Study. The SYMBA Study did not envision the establishment of new shipyards, such as occurred in both World War I and World War II. Overall, the study presents a relatively modest assessment of mobilization demands compared to the actual experience in previous national emergencies.

Added Shipbuilding to Sustain Needed Capacity

Since the additional 40,000 production workers identified by the SYMBA Study would be needed early in the mobilization, little time would exist to recruit and train new personnel. These workers, therefore, would have to be part of the permanent work force sustained by the work available to the industry.

A recent study prepared by the staff of the Maritime Administration estimates that about 19,000 shipyard production workers, beyond those needed for Navy work, will be occupied with commercial ship repair and nonship work, even in the absence of new commercial ship construction orders. This would leave a shortfall of about 21,000 production workers who would need to be employed in order to maintain the work force requirement of the SYMBA Study. Using wages, benefits, and applied overhead rates typical of the industry today, it would take about $1.2 billion annually in revenues to support an additional 21,000 production workers. Considering labor and overhead as 60 percent of the cost of a typical newly constructed ship, it would require about $2.0 billion annually in new ship orders to sustain this labor force. This translates to 20 to 30 ships per year at typical U.S. current merchant ship prices.

Earlier analysis suggested that an average annual addition of about 20 ships would be necessary to maintain adequate military sealift capacity over the long term. The above analysis suggests that production of 20 cargo ships per year in U.S. shipyards could nearly maintain the additional shipyard capacity that the SYMBA Study identified as needed for mobilization. The level of 20 additional ships, therefore, is used in Chapter V as the production goal for the various policy options. Although derived from the results of the recent studies discussed above, this 20-ship level should be viewed as an illustrative benchmark, not an immutable requirement. As the preceeding discussion indicated, arguments can be made for lesser or greater amounts of maritime support, depending on the observer's view of the importance of domestic shipping and shipbuilding to national security and the degree of risk that one is willing to tolerate in this area.

CHAPTER V. MAINTAINING THE MARITIME INDUSTRIES FOR NATIONAL SECURITY: ALTERNATIVE STRATEGIES

Previous chapters have reviewed the history and current status of the U.S. shipping and shipbuilding industries and have examined the importance of these industries to U.S. national security. Recent studies indicate that currently available shipping and shipbuilding resources are only marginally adequate for mobilization and wartime military support purposes. In addition, present trends indicate that both industries are shrinking, causing concern that they may soon contract below prudent security levels. The Congress, therefore, may wish to consider what, if anything, should be done to ensure that the maritime industries are maintained with adequate capabilities to support national security requirements. This chapter reviews current policies and examines several alternative strategies for achieving a strengthened maritime position.

CURRENT MARITIME POLICIES

Current maritime policies are the result of a long historical development, as outlined in Chapter II. This evolution has led to government measures--subsidies, cargo reservation, tax incentives, financing aids (see box on page 33)--established at various times, with the common objective of furthering a healthy merchant fleet and shipbuilding industry. These measures, which are discussed briefly in Chapter III, are covered in more detail in other publications, including a study recently published by the Office of Technology Assessment. 1/ Only a very brief recapitulation of current policies, therefore, is presented here.

Major programs currently authorized by law for the support of the maritime industries are summarized in Table 14. These measures have served, however imperfectly, to sustain a merchant marine and shipbuilding industry in this country. The current problem is that industry trends are falling and a contraction of current capabilities in both industries seems imminent. Such a contraction would result in less support capacity than now available and, if recent assessments are accurate, less than prudent to support national security needs.

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1. Office of Technology Assessment, An Assessment of Maritime Trade and Technology, OTA-O-220 (October 1983). See also Ernst G. Frankel, Regulation and Policies of American Shipping (Boston: Auburn House, 1982).

TABLE 14. SUMMARY OF CURRENT U.S. MARITIME PROGRAMS AND ESTIMATED ANNUAL BUDGETARY EFFECTS

Program	Purpose/ Requirements	Recipients	Approximate Yearly Cost
Operating Differential Subsidy (ODS)	Equalize operating cost for U.S.-flag vessels with foreign competition on certain trade routes.	U.S.-flag liners and (since 1970) bulk carriers with ODS contracts.	$380 million a/
Construction Differential Subsidy (CDS)	Encourage ship construction in U.S. shipyards by paying up to 50 percent of competitive or 35 percent of negotiated contracts.	U.S.-flag and U.S.-owned ships operated in U.S. foreign trade.	No longer funded
Ship Mortgage Guarantee (Title XI)	Encourage ship construction in U.S. 87.5 percent guarantee of actual costs for unsubsidized ships, 75 percent for CDS ships.	All U.S.-built ships, including oceangoing and inland trades. U.S.-flag operation only.	Contingent liability only. Limit now $12 billion for all outstanding guarantees. b/
Capital Construction Fund (CCF)	Tax deferral on funds deposited for ship replacement construction in U.S. shipyards only.	U.S. citizens owning or leasing ships.	$270 million c/
Investment Tax Credit	Encourage investment in new or used ships.	U.S. citizen shipowners who are qualified operators.	$150 million d/

(Continued)

TABLE 14. (Continued)

Program	Purpose/ Requirements	Recipients	Approximate Yearly Cost
Ad Valorem Duty on Ship Repairs	Encourage use of U.S. shipyards by U.S.-flag ships for nonemergency repairs.	Paid by U.S.-flag ship operators, benefits U.S. shipyards	$10 million (tax receipts)
Ship Exchange Program	Provide for exchange of U.S.-flag or U.S.-built ships for ships in National Defense Reserve Fleet.	U.S. citizen shipowners who are qualified operators.	No budget effect
Ship Trade-In Program	Encourage replacement of subsidized ships.	Subsidized U.S. citizen owner/ operators upon delivery of new subsidized ships.	No budget effect
Research & Development Program	Develop technology to modernize maritime industries.	Administered by MarAd. Many cost-sharing programs with industry.	$3 million e/
Cargo Preference	Give preference to U.S.-flag ships for government-owned or financed cargo.	U.S.-flag ships.	$100 million f/
Cabotage	Reserve intracoastal domestic routes for U.S.-flag ships.	U.S.-flag ships without subsidies.	No budget effect g/
Maritime Administration	Operations and training	Not applicable.	$70 million h/
	Agency funding	Not applicable	$12 million h/
Total Costs			$975 million

(Continued)

TABLE 14. (Continued)

a. Administration budget request for fiscal year 1985 is $378.8 million.
b. Liabilities from defaults are covered from a "Ship Financing Fund," which is funded by fees paid by ship owners (½ to 1 percent of outstanding loan balance). No appropriated funds have ever been required to support the Title XI program and the Ship Financing Fund currently has a net inflow of about $50 million per year from fees.
c. The Capital Construction Fund permits the indefinite deferral of taxes on corporate income deposited in the fund and used for construction or reconstruction of certain ships in U.S. shipyards. As a practical matter, this is usually equivalent to elimination of the tax on this income unless it is withdrawn from the fund for some other purpose. The estimate of $270 million is the tax that would have been collected from recent annual new deposits, assuming a marginal tax rate of 48 percent.
d. Ship and shipyard operators, like other businessmen, qualify for the investment tax credit (ITC) for new capital investment. In 1981, the latest year for which data is available, the ship operating and shipbuilding industries had qualifying investments totaling $1,505.6 million. With a 10 percent credit, the maritime operators could have deducted about $150 million from their tax liabilities. Only $73.5 million in credits was actually claimed in 1981, however, presumably because many companies had no profits and thus no tax liability that year against which to apply the credit. Since the remaining credits can be deferred and claimed against future taxes in profitable years, the entire $150 million is listed as the approximate ITC tax expenditure for one year.
e. The Administration budget request for the research and development program administered by MarAd is $3 million for fiscal year 1985, down considerably from the $11.4 million of fiscal year 1984.
f. The additional shipping cost incurred by the government because of preference given to U.S.-flag ships was recently estimated by the General Accounting Office at between $71 and $79 million in 1980. In fiscal year 1985 dollars, this would be equivalent to about $100 million.
g. Although cabotage has no direct impact on the federal budget, it does have an effect on the economy. It is estimated that the cost to the economy from cabotage in fiscal year 1983 was about $1.3 billion. This is the cost to shippers for U.S.-flag services above the cost of the same services from foreign-flag ships. The major portion of this amount (about $1 billion) is attributable to the carriage of Alaskan North Slope crude oil to the continental United States.
h. Estimates based on Administration fiscal year 1985 budget request.

These programs, whose collective costs approach $1 billion per year in budgetary and revenue expenditures, no longer appear sufficient to sustain the desired level of maritime capabilities.

ADMINISTRATION POLICIES

The Administration is moving away from direct subsidies. It has discontinued all construction differential subsidy (CDS) payments and is phasing out operating differential subsidies (ODS). Although the Administration is making payments under existing ODS contracts, as it legally must, no new ODS contracts have been granted by the Administration nor are any planned.

Legislative Initiatives

The Administration has put forward in the 98th Congress legislation (H.R. 3156/S. 1038) with the following provisions:

- ODS would be permitted for U.S.-flag ships built abroad;
- Foreign-built ships operating under the U.S. flag would be eligible to carry U.S. government cargo;
- The limit on foreign ownership of U.S. shipping firms would be raised from 49 percent to 75 percent;
- The use of Capital Construction Funds (CCF) would be authorized for building U.S.-flag ships in foreign shipyards as well as in U.S. shipyards; and
- The 50 percent ad valorem tax on repairs to U.S.-flag ships made in foreign shipyards would be repealed.

The major intention of these measures is to reduce the capital costs of U.S.-flag ship operators by allowing them to patronize cheaper foreign shipyards. In this way, the Administration hopes to stimulate the U.S. merchant fleet without increasing subsidies or tax expenditures. If successful this approach would be less costly than any of the options suggested below. In the view of others, however, this program would not be likely to stimulate much additional U.S.-flag shipping and, to the degree that it is successful, the effect would be to help U.S. ship operators at the expense of U.S. shipbuilders. Not surprisingly, the abandonment of long-sacrosanct incentives for using U.S. shipyards is opposed by the shipbuilders and their allied industries.

Nor is it clear that the Administration's plan would, in fact, increase the size of the U.S.-flag shipping fleet. The approach harkens back to the 40-year struggle of "free ship" advocates that culminated in 1910 with passage of a law permitting U.S. registration of foreign-built ships. The hope then that U.S. owners of foreign-built, flag-of-convenience ships would register their ships in the United States went unfulfilled because it was still cheaper to operate abroad. This may, once again, be the case, since it is not only higher capital costs but higher manning costs that motivates foreign registration today. Referring back to the three illustrative ships in Table 7, Chapter III, recall that Ship B--representative of the Administration's approach--still had significantly higher costs than the lowest-cost Ship C, which was registered under a foreign flag.

Sealift Enhancement Initiatives

The Administration is also moving to enhance the military usefulness of the current cargo fleet by procuring "sea sheds" and "flat racks" to convert commercial ships for military cargoes, and by purchasing militarily useful ships that might otherwise be retired and putting them in the Ready Reserve Fleet (RRF). Although these programs do not increase the total numbers of ships available or the total cargo capacity of the U.S.-flag fleet, they do increase the military support capabilities of the fleet at relatively modest cost. 2/

In order to alleviate the cargo handling problem created by the large number of active ships that do not have self-loading and off-loading capability, the Administration plans to procure "Crane Ships" (TACS). These are converted merchant ships that can provide cargo handling capabilities in undeveloped or damaged ports. The Administration currently plans to procure 11 ships of this type.

Probable Effects of Administration Policies

Since the Administration's policies offer very little support for the shipbuilding industry beyond Navy work, they would probably result in a

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2. Enough sea sheds and flat racks to convert a typical containership into a ship capable of carrying tanks, trucks, howitzers, and so forth, would cost about $10 million. A new, U.S.-built roll-on/roll-off ship would cost about ten times that amount. In June 1984, the Navy announced that it had purchased 19 ships, ranging in age from 17 to 21 years, for a total of $30 million. The 19 ships will be added to the current 32 ships in the Ready Reserve Fleet.

reduction in shipbuilding capability below that recommended in the SYMBA Study discussed in Chapter IV. This would clearly involve some risk, but a risk that policymarkers, faced with competing demands, might elect to take. A contingency of the scale contemplated in the SYMBA Study might never arise, or, if it did, better management of assets and/or use of allied shipyards might mitigate the effect of deficiencies.

The Administration programs concentrate on available, usable sealift resources. Purchases of older ships and of sea sheds and flat racks would enhance the useful cargo capacity of the fleet at about a tenth of the cost of new ships of similar total capacity. Although sealift capacity is increased at bargain costs, these expedients do not increase the active merchant marine or the maritime labor force. The legislative initiatives to reduce capital costs for ship operators--by allowing them to operate foreign-built ships--are an attempt to deal with that problem.

In recent testimony, Administration witnesses have suggested that they may wish to modify or build on the policy proposals already put forward. Thus the remainder of this chapter discusses broad alternative approaches that the Administration or the Congress could consider to increase U.S. shipbuilding and shipping.

MARITIME SUPPORT MECHANISMS

In considering alternative methods to support the maritime industries, it is important to define clearly and to keep in focus the motivations for providing government assistance. As discussed in Chapter III, the historic arguments for maritime supports have centered either on economics or on national security.

Policy Objectives

The economic justifications are increasingly weak. The United States now transports only a small portion (less than 6 percent by weight) of its growing foreign commerce in U.S.-flag ships and is unlikely to increase this amount by much in the foreseeable future. Because of the factors discussed in Chapter III, foreign ship operators are able to offer shipping services at significantly lower rates than U.S.-flag operators. Paying higher rates for U.S.-flag shipping--however it might be done--can only harm, not help, the U.S. economy.

Similarly, U.S. shipyards are unable, for the reasons outlined in Chapter III, to offer, or even approach, the prices offered by foreign shipbuilders for most types of cargo ships. This, of course, is a major factor in the

inability of U.S.-flag ship operators to offer competitive freight rates. In this industry also, there is little prospect that the United States will become competitive in the foreseeable future, and economic arguments for supporting uncompetitive industries are usually weak.

Conversely, the national security rationale for sustaining the maritime industries is much more persuasive. The considerations reviewed in Chapter IV clearly indicate a current and continuing need for substantial U.S.-flag sealift assets to support U.S. military forces during national emergencies. Indeed, sealift would play a major role in almost any emergency short of all-out nuclear war, and relying upon foreign-flag shipping for direct support of U.S. military operations might be imprudent. The United States also needs a shipbuilding industrial base to support both naval forces and sealift ships in peacetime, mobilization, and wartime.

Security, rather than economic considerations, therefore, should govern decisions concerning government support of the maritime industries. This is not to say that economic considerations and commercial efficiency should be disregarded in maritime policymaking. Clearly, both national security and economic efficiency should be served, if possible. When the two conflict, however, as may often be the case, policies motivated by national security should serve security interests first.

Policy Mechanisms

Measures to support the maritime industries take three basic forms: subsidies, cargo preference, and direct government procurement of cargo ships (see Table 15 for outline). Although actual policy has been and probably will continue to be a mixture of all these forms, the implications of maritime policy alternatives may be more visible if the policy options are structured around one of these basic forms. Each approach has features that can be considered strengths or weaknesses, depending on the point of view.

Subsidies. Direct federal subsidies--such as ODS and CDS--are straightforward and visible. They can be rather precisely designed to accomplish a specific result. They are widely believed, however, to distort market incentives and foster inefficiencies whose costs may considerably exceed the direct cost of the subsidies. Indirect subsidies--such as tax incentives and financing support--generally are less visible and are less precise in accomplishing a given objective. Indirect subsidies are also believed to result in inefficiencies, but some would argue that, like direct subsidies,

TABLE 15. FORMS OF SUPPORT FOR MARITIME INDUSTRIES

Form of Support	Type	Examples or Characteristics
Subsidies	Direct	Operating Differential Subsidy Construction Differential Subsidy
	Indirect	Tax incentives Financing support
Cargo Preference	Unilateral	Cabotage (Jones Act) Government-impelled cargo shipments Specified market share (Boggs Bill)
	Bilateral and multilateral agreements	Bilateral trade sharing UNCTAD multilateral norms
Direct Government Procurement, Operation, and/or Lease of Cargo Ships	Emphasizing commercial competitiveness	Large, specialized, non-self-sustaining cargo ships Minimum operating costs
	Emphasizing military usefulness	Smaller ships with diverse cargo capability and self-unloading ability

they allow policymakers some necessary control over markets in order to accomplish legitimate national objectives.

Cargo Preference. Cargo preference--which grants U.S.-flag shipping exclusive rights to carry certain cargoes--is an indirect form of support

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whose costs are borne by the economy, not by the government. 3/ Since cargo preference does not appear in the budget and is not very visible in other ways, its true costs are difficult to assess. The objective of cargo preference is to create a market which will, in turn, develop certain desirable resources--namely, shipbuilding and U.S.-flag shipping--to serve that market.

Cargo preference can be established by unilateral action or by mutual agreement among trading nations. A major development in this area is the recent adoption of a "Code of Conduct for Liner Conferences" by the United Nations Conference on Trade and Development (UNCTAD). This code declares that each trading nation has the right to reserve a "significant portion," interpreted as 40 percent, for its national-flag carriers. Thus the norm under the code would be 40 percent of trade carried by the ships of each trading partner, with 20 percent left for third parties. The United States has consistently opposed the UNCTAD Code but has entered into several bilateral agreements with other nations that reserved portions of cargo for ships of the trading partners.

U.S. law already provides for other forms of cargo reservation, such as military support, agricultural products, strategic petroleum reserves, and other government-impelled cargoes, discussed in Chapter III. Recently proposed legislation (H.R. 1242/S. 1000) would, when fully effective, reserve 20 percent of U.S. bulk cargoes for U.S.-flag ships.

Cargo preference is one of the most widely used forms of maritime support. It is, however, a blunt instrument which may not produce exactly the desired results. For example, while it may induce owners to procure new ships, the ships may not be the types best suited for military support. Or it may motivate owners to keep old inefficient ships in operation when policymakers want new ships.

Direct Procurement. Direct government procurement, operation, and/or lease of cargo ships should, on the other hand, produce precisely the numbers and kinds of ships the government wants, if sufficient funds are

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3. It is possible to transfer some or all of the burden of cargo preference back to the government by allowing tax credits for shippers who must pay higher freight rates because of preference requirements. This has been suggested as a modification to the Boggs Bill (H.R. 1242/S. 1000) discussed below. This report assumes that such credits would not be allowed since most earlier cargo preference legislation has excluded these credits.

made available. The federal government has used direct procurement, which is authorized in law by Title VII of the Merchant Marine Act of 1936, in times of extreme emergency as was demonstrated in World Wars I and II. Since this approach necessitates direct budget expenditures, it may not be as desirable politically as the other less obvious support methods. Ships procured in this way would compete directly with other programs for limited budget resources. Government procured ships ideally would be leased to private operators in peacetime for commercial operations that would train and support a pool of American mariners.

Further Considerations: Policy Administration and Industrial Policy

Regardless of the forms of maritime support chosen, the structural arrangements for administering maritime policy should also be considered. The existing arrangements have evolved along with policy (see Chapter II) and are now largely centered in the Maritime Administration. If maritime policy were directed more toward military support rather than commercial activities, then the Department of Defense probably should become more involved.

Another important consideration that transcends the various policy options is the issue of what if any special arrangements should be made to facilitate the financing of maritime ventures and to administer an industrial policy for the supporting industries. One comprehensive approach is contained in legislation introduced in the 98th Congress, the Maritime Redevelopment Bank Act of 1983 (H.R. 3399). This bill would establish a Maritime Redevelopment Bank with broad authority to finance maritime ventures and to marshall capital for industrial revitalization in the shipbuilding industry. Although even the best financing arrangements will not alter fundamental competitive disadvantages, something like the proposed Maritime Redevelopment Bank would help American maritime interests capitalize on those opportunities that do exist.

OPTIONS FOR MARITIME POLICIES

This section considers three policy options with the common objective of inducing the construction in U.S. shipyards of about 20 cargo ships per year and their subsequent operation under U.S. registry. Production of about 20 ships per year would be approximately the number required, as discussed in Chapter IV, to sustain the sealift capability needed for wartime operations. Such production would also provide work to sustain a larger shipbuilding industrial base for a wartime mobilization. Each option emphasizes one of the basic approaches to maritime support:

- Subsidies,
- Cargo preference, and
- Direct government procurement.

The number of ships produced annually could, of course, be reduced or increased with any of the options. If the 20-ship objective was reduced, the result would be a smaller or older (on average) cargo fleet and smaller industrial base, with a necessarily higher risk of not meeting lift and mobilization requirements. A higher annual input of new cargo ships would, clearly, have the opposite effect.

In each option it is assumed that curent policies (including cabotage, reservation of government cargoes, financing assistance, and so forth) remain in place, with the exception of the direct subsidies--construction differential subsidies (CDS) and operating differential subsidies (ODS). The Administration is phasing out direct subsidies and has not replaced them with any other support mechanisms. Option I puts renewed emphasis on CDS and ODS and Options II and III assume they are phased out. All options would sustain shipyard capacity for wartime mobilization and support and would result in more ships being operated in the U.S. fleet, thus maintaining a pool of trained mariners--a wartime asset. Principal differences among the options would be in the kinds of ships that would be built and in the amount and source of funds to pay for them.

Option I: Subsidies

Construction differential subsidies and operating differential subsidies, which are described in Appendix C, have been a major form of support for the maritime industries since they were authorized by the Merchant Marine Act of 1936. To date, total outlays for these programs have reached over $10 billion.

This option would use CDS to induce private shipping companies to order an average of about 20 new ships per year from U.S. shipyards and would use ODS to induce them to operate those ships with American crews. To do this, the current legal limit for CDS of 50 percent of the total contracted ship cost might have to be raised. ODS would be used, as it is today, to compensate ship operators for the additional costs of operating under U.S. registration.

CBO estimates that the cost of such a program would average about $1.3 billion annually in 1984 dollars between now and the year 2000. This

estimate assumes a construction subsidy averaging about $50 million per ship for 20 ships each year and an annual operating subsidy of about $2.3 million per ship, an average based on typical U.S. versus foreign operating cost differences. Costs would be lower in the early years and higher in later years as more ships were added to the fleet. If current practices were continued, these funds would be budgeted to the Department of Transportation and administered by the Maritime Administration. 4/

For this option to work, it would be necessary for ship operators to perceive a sufficient market opportunity to induce them to invest in new shipping. Although it could be expected that some level of subsidies would induce a corresponding level of shipbuilding and ship operation in the long term, there might be periods when adverse market conditions would make new investments from the private sector questionable. It could be expected that the pattern of ship construction under this option would be uneven, fluctuating with the familiar boom and bust cycle of the maritime market.

Since the ships procured would be those ordered by commercial operators, they would be designed to emphasize commercial efficiency. Although this would reduce the amount of necessary subsidy, commercial efficiency is often achieved at the expense of military utility in modern cargo ships. This option, therefore, would probably result in a fleet containing many ships of limited military usefulness. It would, however, generate business for the shipbuilding industrial base and would sustain a higher level of peacetime U.S.-flag shipping activity than would be the case without subsidies.

Option II: Cargo Preference

Cargo preference can take many forms, and, as discussed in Chapters II and III, several forms are currently in effect in U.S. law. This option assumes that all existing cargo preferences would remain in effect and that additional preference would be enacted similar to that proposed in the 98th Congress by the "Competitive Shipping and Shipbuilding Act of 1983" (H.R. 1242/S. 1000). This bill stipulates that in the year after passage at least 5 percent of all bulk cargoes in and out of U.S. ports would have to be shipped in U.S.-flag ships. The required portion would rise by 1 percent each year until it reached 20 percent. Under this bill, U.S.-flag ships eligible for these

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4. The estimate of $1.3 billion is the average for the first 16 years of such a program and includes $1.0 billion per year for CDS (about $50 million on average per ship) and ODS ranging from 0 in the first year to $644 million in the last.

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cargoes would have to be built and registered in the United States and manned by U.S. citizens.

This legislation, often called the "Boggs Bill" for Representative Lindy Boggs who introduced it, has stimulated much debate. It has, in general, been supported by spokesmen for the maritime industries, which would benefit, and opposed by exporters and importers, who would pay higher freight rates. The bill would immediately create a substantial and growing market for both the shipping and shipbuilding industries but at the cost of higher average transportation costs for oceanborne bulk cargoes.

Cargo preference of the kind proposed in H.R. 1242/S. 1000 would have no direct impact on the federal budget. 5/ The burden would, instead, fall on the economy in ways that are difficult to predict accurately. Several studies of this type of legislation have been undertaken with widely varying results. 6/ CBO estimates that the economic effect of this legislation, with full 20 percent reservation, would be between $3.0 billion and $4.0 billion per year as a result of increased transportation costs (see Appendix E).

This impact, it is again emphasized, would not be borne by the federal budget but would be a burden imposed indirectly on consumers in the form of higher prices induced by higher ocean transportation costs. As an indirect measure, it is less susceptible to government control in achieving desired objectives. The ships produced by this measure would have to compete with each other for a share of the market that is set aside by the legislation. They would be designed, therefore, to emphasize commercial

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5. There would be no budget impact unless, as has been suggested, shippers were given tax credits to relieve some of the burden of cargo preference.

6. Center for Naval Analyses, Defense and Economic Aspects of H.R.-1242 (Competitive Shipping and Shipbuilding Act of 1983), CNR62 (June 1983); U.S. Department of Transportation, Maritime Administration, unpublished internal study (updated September 28, 1983); American Petroleum Institute, Testimony on S. 206, S. 1616, and S. 1624, before the Subcommittee on Merchant Marine, Senate Committee on Commerce, Science, and Transportation, 98:1 (September 29, 1983); Federation of American Controlled Shipping, Statement of Philip J. Loree, Chairman, on S. 188, S. 206, S. 1616, and S. 1624 (including amendment #1516), before the Subcommittee on Merchant Marine, Senate Committee on Commerce, Science, and Transportation, 98:1 (September 1983).

efficiency, not military utility. Undoubtedly, the ships would be bulk carriers which are normally considered to be among the least useful kinds of shipping for military support. 7/

Enactment of this legislation would be a boon to the shipbuilding industry, however, creating a demand estimated in various studies for about 20 to 30 new ships annually over the next decade. This would clearly be important in preserving a ready shipbuilding industrial base to support any future mobilization. It would also result in higher peacetime U.S.-flag shipping activity and a larger pool of trained American mariners.

Option III: Direct Government Procurement

Under this option, the government would purchase cargo ships directly from U.S. shipyards and offer them for lease to U.S. commercial operators for whatever rate the market would bring. The government could, for example, procure about 20 militarily useful cargo ships annually that would be designed to provide needed sealift capabilities but that would also incorporate as much commercial efficiency as possible. A few might be used by the Military Sealift Command but most would be offered for lease to U.S. citizens for use in international trade, with the highest bidder being awarded the lease. It is unlikely that leasing revenues would fully recover the costs of these ships, but the revenues would, at least, partially offset some of the expense.

In addition procurement of about 20 cargo ships per year from U.S. shipyards would infuse much needed business into that industry and thus help support the industrial base requirement discussed in Chapter IV. The resulting economic activity would create jobs, a trained manpower pool, and tax revenues that would recoup to some degree the cost of sustaining this national security asset.

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7. Commercially efficient modern bulk carriers tend to be large ships with deep drafts that restrict the ports and harbor areas in which they can be used. In addition, the cargo holds in bulk carriers are suitable only for bulk commodities. Since most military cargoes are not bulk shipments, ships of this kind would have to undergo modification to accommodate military shipments. Although such modification is possible, it would require time, money, and shipyard availability during the crucial mobilization period, and the modification would not cure the deep draft problem.

It is possible that, under poor market conditions, private operators might not come forward to lease the ships even at very low rates. In severely depressed shipping markets, with very high crew costs, government procured ships might be uncompetitive even when capital costs (normally about 30 to 50 percent of total operating costs for new U.S.-flag ships) are nearly zero. When such conditions occur, the government could make a choice. If the pool of trained mariners was judged adequate for wartime mobilization, ships could be placed in the reserve fleet to await better times or military mobilization. Alternatively, the government could choose to pay to have the ships operated, thus raising costs above those in this option but also ensuring the maintenance of more trained mariners.

Operators leasing these ships would face market pressures on their operating costs and competition from other operators for cargoes. Thus there should be incentives for efficient operation and for providing reliable service.

Assuming an average price of $100 million per ship (the average price of 16 commercial ships recently under construction in U.S. shipyards), such a program would require outlays of about $2 billion per year. Currently the shipping market is, in fact, in a severely depressed state and, if offered today, leases might attract no bids. In better markets, bids could be expected, but, unless the difference was narrowed between foreign and U.S. ship prices, lease revenues would probably not recover more than about 25 percent of the cost of government procured ships. 8/ The net cost--outlays less lease revenues--of this kind of program is estimated at about $1.5 to $2.0 billion per year. This program would, of course, appear in the budget--most appropriately, perhaps, in the Defense Department budget.

Option III would produce cargo ships substantially more responsive to military sealift needs than the other options but ones probably less competi-

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8. Lease bids would vary widely based on a variety of factors, including ship type, market conditions, and U.S. versus foreign ship prices. A simple insight can be derived by considering an example of a militarily useful ship which costs $100 million in the United States but $40 million abroad. If the ship fulfills an operator's needs (and tax and other considerations are equal), he should be willing to bid up to 40 percent of the actual capital cost of the government's ship. Other considerations are not equal, however, since the government's ship would probably not exactly suit his needs. So he would bid below 40 percent, and probably no more than about 25 percent of the actual capital cost of the ship. In adverse market conditions, bids would be still lower and might go to zero.

tive in commercial trade. It would not require new legislation since direct government procurement of cargo ships is authorized by the Merchant Marine Act of 1936. In fact, direct procurement has been the only successful means found in this century for rejuvenating U.S. merchant shipping. In retrospect, the U.S. maritime industries have been in a chronically depressed state since before the turn of the century, except for the periods during and immediately after the two World Wars, when massive government building programs reestablished the U.S.-flag merchant marine. Direct procurement has a long history and is well-established in law and practice.

Maritime Policy Strategies: Recapitulation

The three basic maritime policy options, discussed above, are summarized in Table 16. All options would result in building about 20 cargo ships per year and would, therefore, help support a larger U.S. merchant marine and shipbuilding industrial base. All options, however, would involve significant costs, ranging from $1.0 billion to $2.0 billion in budgetary costs for Options I and III or $3.0 billion to $4.0 billion in economic cost under Option II. 9/ In U.S. history, no way has been found to create a larger merchant marine or shipbuilding base without imposing an economic cost. The burdens estimated, though substantial, are modest in the context of overall annual support to U.S. industry and annual outlays for defense as a whole. 10/

Other Policy Options

Beyond the three basic policy options discussed above, there are, of course, an infinite number of variants and blends of these strategies. Some of these are illustrated in Table 17.

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9. Although Option II has no direct federal budgetary impact, it definitely would be a burden on the economy in the form of high prices for transportation.

10. See Congressional Budget Office, Federal Support of U.S. Business (1984). Direct federal spending programs in support of U.S. business are projected to total $13.7 billion in fiscal year 1984. Business credit programs are projected to cost an additional $8.8 billion. The three largest business tax expenditures are each projected to result in 1984 revenue losses larger than either the direct or the credit programs: the accelerated cost recovery system, $18.3 billion; capital gains, $16.4 billion; and the investment tax credit, $15.7 billion.

TABLE 16. OPTIONS TO INDUCE CONSTRUCTION OF 20 MERCHANT SHIPS ANNUALLY IN U.S. SHIPYARDS (Costs in 1984 dollars)

Options	Estimated Average Annual Cost	Where Do Costs Appear	Commercial Efficiency of Ships	Military Usefulness of Ships	Peacetime U.S.-Flag Ship Activity
Subsidies (I): Use CDS and ODS to induce building and operating 20 ships per year. a/	$1.0-1.5 billion	Department of Transportation budget	High	Low	Higher
Cargo Preference (II): Boggs bill approach. Induce commercial orders for about 20 ships per year	$3.0-4.0 billion	Off-Budget, impact on shippers	High	Low	Higher
Direct Government Procurement (III): Procure 20 ships per year, operate in MSC, lease out, or assign to Ready Reserve Fleet. b/	$1.5-2.0 billion	Defense budget	Low	High	Moderately higher

SOURCE: Congressional Budget Office.

a. CDS = Construction Differential Subsidy. ODS = Operating Differential Subsidy.
b. MSC = Military Sealift Command.

TABLE 17. OTHER POLICY OPTIONS (Costs in 1984 dollars)

Option	Estimated Annual Cost	Where Costs Appear	Emphasize Commercial or Military Utility	Shipbuilding Industry Effects	Merchant Marine Effect
Procure ships on open market, lease out or assign to RRF 20 ships/year a/	$30-300 million	DoD budget	Military	Modest, conversion work only	Moderately positive
Build half in U.S. and procure half on open market, 20 ships/year	$900-1,200 million	DoD budget	Military	Positive	Moderately positive
Administration program plus CDS plus open market procurement b/	$500-700 million	DoD and DOT budget	Commercial and military	Positive	Positive

SOURCE: Congressional Budget Office.

a. RRF = Ready Reserve Fleet.
b. CDS = Construction Differential Subsidies. Open market procurement may not result in 20 ships per year in U.S. shipyards.

As a variant of the direct procurement option, the government could procure militarily useful ships in the open market rather than build new ships in U.S. shipyards. (The Administration has recently adopted this approach, as noted earlier in this chapter.) This would substantially reduce the cost of acquiring the ships, but it would also reduce the work available

for the shipbuilding industry. In the currently depressed shipping market, nearly new, militarily useful ships are available for a fraction of their replacement cost. 11/

In another variant of the direct procurement approach, the government could build some militarily useful ships in U.S. shipyards and procure some in the open market. If half of an annual procurement of 20 ships was obtained in each way, some business would be available for U.S. shipbuilders, but the cost of a 20-ship per year program would be lower than in Option III above.

A blending of several approaches might be to reduce or eliminate restraints on procurement of ships abroad, as advocated by the Administration; to reestablish CDS for some number of U.S.-built ships each year; and to procure militarily useful ships in the open market to build up sealift reserves. Such a blend of policies would seek to serve the somewhat divergent interests of ship owners, ship builders, and military planners.

CONCLUSIONS

Today, burdened by higher costs than their overseas competition and facing a severely oversupplied market, the U.S. maritime industries are struggling for survival. In addition, the trends in ocean transportation are such that the newer commercially competitive ships are increasingly unsuited for military support operations. Given these commercial realities, the ability of the private sector to support the national security sealift requirements is becoming increasingly questionable.

This report has presented several policy options for consideration by the Congress. Selection among them should probably be governed by weighing basic objectives, especially commercial efficiency and military utility. With the possible exception of the economic impact of the cargo preference option, the differences in cost estimates are not sufficiently large, given inherent uncertainties, to be decisive even if cost were the prime criterion in selection. If the key policy objective were the maintenance of enough

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11. For example, British-owned "M-class" multipurpose cargo ships with excellent military support capabilities are available for under $10 million. These ships, built in the late 1970s, and used by the British in the Falklands, carry containers, vehicles, and breakbulk cargo. They are for sale because of the depressed condition of the markets they were designed to serve.

U.S. shipping and shipbuilding to provide an adequate base for national security requirements, direct procurement would guarantee ships that would be militarily useful. If the key policy objective were, rather, to maintain more peacetime shipping for the U.S.-flag fleet, then cargo preference or direct subsidies would offer advantages.

APPENDIXES

APPENDIX A. TABLES

This appendix contains tables displaying various numerical indicators of the status of the U.S. maritime industries. The information is current to January 1, 1984 except for Table A-4 for which the latest available data is January 1, 1983.

TABLE A-1. U.S.-FLAG OCEANGOING MERCHANT MARINE, BY STATUS AND OWNERSHIP, AS OF JANUARY 1, 1984 (In thousands of tons)

U.S.-Flag Fleet	Privately Owned			Government Owned a/			Total		
	Number Ships	Gross Tons	Dead-weight Tons	Number Ships	Gross Tons	Dead-weight Tons	Number Ships	Gross Tons	Dead-weight Tons
Active Fleet									
Passenger/pass. cargo	5	74	42	4	44	33	9	118	75
General cargo	51	615	742	5	34	40	56	649	782
Intermodal b/	126	2,552	2,701	0	0	0	126	2,552	2,701
Bulk carriers	19	388	675	0	0	0	19	388	675
Tankers	227	6,969	12,956	2	14	20	229	6,983	12,976
Subtotal	428	10,598	17,116	11	92	93 c/	439	10,690	17,209
Inactive Fleet									
Passenger/pass. cargo	2	26	16	27	351	203	29	377	219
General cargo	39	373	468	191	1,586	2,128	230	1,959	2,596
Intermodal b/	17	328	378	8	127	133	25	455	511
Bulk carriers	5	209	342	0	0	0	5	209	342
Tankers	47	1,852	3,250	13	171	282	60	2,023	3,532
Subtotal	110	2,788	4,454	239	2,235	2,746	349	5,023	7,200
Total Fleet									
Passenger/pass. cargo	7	100	58	31	395	236	38	495	294
General cargo	90	988	1,210	196	1,620	2,168	286	2,608	3,378
Intermodal b/	143	2,880	3,079	8	127	133	151	3,007	3,212
Bulk carriers	24	597	1,017	0	0	0	24	597	1,017
Tankers	274	8,821	16,206	15	185	302	289	9,006	16,508
Total, U.S.-Flag	538	13,386	21,570	250	2,327	2,839 d/	788	15,713	24,409

SOURCE: U.S. Maritime Administration.

a. Owned by the Maritime Administration.
b. Containerships and roll on/roll off ships.
c. Includes seven vessels in custody of other government agencies.
d. Includes National Defense Reserve Fleet which consists of 224 ships of which 12 are candidates to be scrapped.

TABLE A-2. SUBSIDIZED VESSELS IN THE U.S. MERCHANT MARINE AS OF JANUARY 1, 1984

	Number
Subsidized Fleet	
Privately Owned	170
Government	0
Total	170
Companies Holding Operating contracts	25

SOURCE: Maritime Administration data.

TABLE A-3. U.S.-FLAG OCEANGOING MERCHANT FLEET, BY STATUS, AREA OF USE, AND VESSEL TYPE, AS OF JANUARY 1, 1984 (Vessels of 1,000 gross tons and over, in thousands of deadweight tons--DWT) a/

Status and Area of Use	Vessel Type: Passenger Pass./Cargo No.	Passenger Pass./Cargo DWT Tons	General Cargo No.	General Cargo DWT Tons	Intermodal No.	Intermodal DWT Tons	Bulk Carriers b/ No.	Bulk Carriers b/ DWT Tons	Tankers c/ No.	Tankers c/ DWT Tons	Total No.	Total DWT Tons
Active Fleet												
Foreign trade												
Nearby foreign	0	0	0	0	3	34	0	0	4	194	7	228
Great Lakes-seaway foreign	0	0	1	14	0	0	1	26	0	0	2	40
Overseas foreign	3	28	31	470	80	1,944	6	276	9	569	129	3,287
Subtotal, Foreign	3	28	32	484	83	1,978	7	302	13	763	138	3,555
Foreign to Foreign	0	0	0	0	6	99	0	0	19	1,254	25	1,353
Domestic Trade												
Coastal	0	0	0	0	4	59	4	166	57	1,942	65	2,167
Intercoastal	0	0	0	0	0	0	2	42	82	5,954	84	5,996
Noncontiguous	2	14	0	0	22	331	4	116	33	2,276	61	2,737
Subtotal, Domestic	2	14	0	0	26	390	10	324	172	10,172	210	10,900
Other U.S. Agency Operations												
M.S.C. charter	0	0	19	258	11	234	2	49	23	767	55	1,308
B.B. charter & other custody	4	33	5	40	0	0	0	0	2	20	11	93
Subtotal, Other	4	33	24	298	11	234	2	49	25	787	66	1,401
Subtotal, Active Fleet	9	75	56	782	126	2,701	19	675	229	12,976	439	17,209

(Continued)

a. Excludes vessels operating exclusively on the Great Lakes, inland waterways, those owned by the United States Army and Navy, and special types such as cable ships, tugs, and so forth.

TABLE A-3. (Continued)

Status and Area of Use	Vessel Type: Passenger Pass./Cargo No.	Passenger Pass./Cargo DWT Tons	General Cargo No.	General Cargo DWT Tons	Intermodal No.	Intermodal DWT Tons	Bulk Carriers b/ No.	Bulk Carriers b/ DWT Tons	Tankers c/ No.	Tankers c/ DWT Tons	Total No.	Total DWT Tons
Inactive Fleet												
Temporarily inactive	0	0	6	85	5	164	4	326	3	431	18	1,006
Laid-Up (Privately Owned)	2	15	33	384	11	198	1	16	44	2,819	91	3,432
Laid-Up (Privately Owned/NRDF) d/	0	0	0	0	1	16	0	0	0	0	1	16
Laid-Up (MarAd Owned/ Other than NDRF) d/	2	19	12	153	1	18	0	0	1	29	16	219
National Defense Reserve Fleet												
Merchant Types	0	0	166	1,863	7	115	0	0	4	118	177	2,096
Military Types	25	185	13	111	0	0	0	0	8	135	46	431
Subtotal, National Defense	25	185	179	1,974	7	115	0	0	12	253	223	2,527
Subtotal, Inactive Fleet	29	219	230	2,596	25	511	5	342	60	3,532	349	7,200
Total, U.S.-Flag	38	294	286	3,378	151	3,212	24	1,017	289	16,508	788	24,409

SOURCE: U.S. Maritime Administration.

b. Includes tug barges.
c. Includes tanker barges and LNGs.
d. NDRF = National Defense Reserve Fleet.

TABLE A-4. FOREIGN-FLAG SHIPS OWNED BY U.S. COMPANIES OR FOREIGN AFFILIATES OF U.S. COMPANIES INCORPORATED UNDER U.S. LAWS, BY COUNTRY OF REGISTRY AND SHIP TYPE AS OF JANUARY 1, 1983 (In thousands of tons)

Country of Registry	Tankers			Freighters a/			Bulk & Ore Carriers			Total		
	No. Ships	Gross Tons	Dead-weight Tons	No. Ships	Gross Tons	Dead-weight Tons	No. Ships	Gross Tons	Dead-weight Tons	No. Ships	Gross Tons	Dead-weight Tons
Liberia	221	16,099	33,481	42	265	378	84	2,923	5,781	347	19,287	39,639
Panama	47	2,688	5,528	24	91	95	21	433	806	92	3,212	6,429
United Kingdom	39	1,863	3,552	10	60	56	7	128	210	56	2,051	3,817
France	10	1,092	2,168	0	0	0	0	0	0	10	1,092	2,168
Germany (West)	6	643	1,299	0	0	0	0	0	0	6	643	1,299
Netherlands	5	523	1,046	0	0	0	0	0	0	5	523	1,046
Saudi Arabia	3	376	772	0	0	0	0	0	0	3	376	772
Norway	10	249	449	0	0	0	0	0	0	10	249	449
Belgium	1	42	77	0	0	0	3	111	194	4	153	271
British Colonies	0	0	0	13	31	43	3	122	213	16	153	256
Australia	3	126	197	0	0	0	0	0	0	3	126	197
Singapore	8	91	191	1	2	3	0	0	0	9	93	194
Argentina	7	111	192	0	0	0	0	0	0	7	111	192
Denmark	5	75	128	0	0	0	0	0	0	5	75	128
Canada	12	77	110	0	0	0	0	0	0	12	77	110
Honduras	0	0	0	7	47	50	0	0	0	7	47	50
Italy	2	27	44	0	0	0	0	0	0	2	27	44
South Africa	1	19	31	0	0	0	0	0	0	1	19	31
Costa Rica	0	0	0	3	9	15	0	0	0	3	9	15
Finland	2	6	9	0	0	0	0	0	0	2	6	9
Greece	0	0	0	2	7	1	0	0	0	2	7	1
Total	382	24,105	49,274	102	512	641	118	3,718	7,204	602	28,334	57,118

SOURCE: U.S. Maritime Administration.

a. Includes two combination passenger and cargo ships.

TABLE A-5. U.S. GREAT LAKES FLEET, BY SHIP TYPE AND STATUS, AS OF JANUARY 1, 1984 (Self-propelled vessels of 1,000 gross tons and over)

Ship Type/ Status	No. Ships	Gross Registered Tons	Estimated Deadweight Tons
Bulk Carriers			
Active	6	107,486	236,750
Temporarily inactive a/	65	959,503	1,819,715
Laid-up inactive (more than 12 months)	57	564,777	1,001,460
Subtotal	128	1,631,766	3,057,925
Tankers			
Active	3	14,022	20,578
Temporarily inactive a/	3	15,304	20,875
Subtotal	6	29,326	41,453
Others b/			
Active	2	7,234	0
Temporarily inactive a/	1	3,968	0
Laid-up inactive (more than 12 months)	6	28,773	0
Subtotal	9	39,975	N.A.
Total	143	1,701,067	3,099,378

SOURCE: U.S. Maritime Administration.

a. Temporarily inactive from icing in winter.
b. Includes railroad car ferries and auto ferries.

TABLE A-6. DISTRIBUTION OF SHIPBOARD JOBS ON OCEANGOING U.S.-FLAG FLEET, BY SHIP STATUS AND TYPE AND WORKER STATUS a/

Ship and Worker Status	Tankers b/	Passenger/ Pass. Cargo b/	Cargo Ships b/
Privately Owned			
Subsidized Ships			
Licensed	162	57	1,330
Unlicensed	296	222	2,813
Subtotal	458	279	4,143
Nonsubsidized Ships			
Licensed	1,979	46	1,001
Unlicensed	3,848	414	2,048
Subtotal	5,827	460	1,049
Total Privately Owned			
Licensed	2,141	103	2,331
Unlicensed	4,144	636	4,861
Subtotal	6,285	739	7,192
Government Owned			
MSC Civil Service Ships			
Licensed	265	0	485
Unlicensed	1,031	0	1,777
Subtotal	1,296	0	2,262
Navy Contract Tankers c/			
Licensed	44	0	0
Unlicensed	80	0	0
Subtotal	124	0	0
Total Government Owned			
Licensed	309	0	485
Unlicensed	1,111	0	1,777
Subtotal	1,420	0	2,262
Grand Total			
Licensed	2,450	103	2,816
Unlicensed	5,255	636	6,638
Total	7,705	739	9,454

(Continued)

TABLE A-6. (Continued)

Ships and Worker Status	Total b/	As of December 1, 1983	As of January 1, 1983
Privately Owned			
Subsidized Ships			
Licensed	1,549	1,650	1,688
Unlicensed	3,331	3,547	3,742
Subtotal	4,880	5,197	5,430
Nonsubsidized Ships			
Licensed	3,026	3,103	3,337
Unlicensed	6,310	6,465	7,269
Subtotal	9,336	9,568	10,606
Total Privately Owned			
Licensed	4,575	4,753	5,025
Unlicensed	9,641	10,012	11,011
Subtotal	14,216	14,765	16,036
Government Owned			
MSC Civil Service Ships			
Licensed	750	745	767
Unlicensed	2,808	2,764	2,917
Subtotal	3,558	3,509	3,684
Navy Contract Tankers c/			
Licensed	44	44	44
Unlicensed	80	80	80
Subtotal	124	124	124
Total Government Owned			
Licensed	794	787	811
Unlicensed	2,888	2,844	2,997
Subtotal	3,682	3,633	3,808
Grand Total			
Licensed	5,369	5,542	5,836
Unlicensed	12,529	12,856	14,008
Total	17,898	18,398	19,844

(Continued)

TABLE A-6. (Continued)

ADDENDUM: Merchant Marine Officer Trainees as of January 1, 1984 d/

	Federal Aid	Nonfederal Aid	Total
State Maritime Academies	1,313	1,361	2,674
U.S. Merchant Marine Academies	1,080	0	1,080
Total	2,393	1,361	3,754

SOURCE: U.S. Maritime Administration.

a. Estimate based on established active jobs for licensed and unlicensed personnel aboard oceangoing ships of 1,000 gross tons and over, privately owned and operated; government-owned ships under charter, supplemented by MSC employment totals for ships with Civil Service crews and contract-operated tankers.
b. As of January 1, 1984.
c. Operated by commercial tanker companies
d. Officer trainee figures are estimated.

TABLE A-7. EMPLOYMENT STATUS OF WORK FORCE IN THE MARITIME INDUSTRIES, BY TYPE OF EMPLOYMENT

Type of Employment	Number
Longshoremen a/	
Atlantic Coast	13,059
Gulf Coast	9,198
Pacific Coast	9,896
Great Lakes	250
Subtotal	32,403
Shipyard Production Employees b/	
MarAd Projects	290
Navy Projects	70,478
Private Projects	9,922
Nonship Work	2,126
Other	1,672
Subtotal	84,488
Great Lakes Shipboard Jobs c/	
Licensed d/	88
Unlicensed d/	264
Subtotal	352

SOURCE: U.S. Maritime Administration.

a. Estimated average employment as of January 1, 1984, including clerks, checkers, and allied crafts.
b. In commercial shipyards in the U.S. active shipbuilding base during October 1983.
c. As of January 1, 1984.
d. Licensed and unlicensed denotes ship officers and seamen respectively.

TABLE A-8. MILITARILY USEFUL U.S.-FLAG CARGO SHIPS, COMPARISON OF 1983 AND PROJECTED 1988 FLEETS, BY TYPE OF FLEET (By fiscal year) a/

Fleet	1983	New Builds	Transfers b/ In	Transfers b/ Out	Scrap	1988
Dry Cargo Fleet						
Commercial fleet						
Freighter/partial containership	89	0	0	33	2	54
Non-self-sustaining containership	90	33	0	12	24	87
Self-sustaining containership	7	0	0	3	0	4
Barge carrier	19	0	0	2	0	17
Container/car carrier	2	0	0	0	2	0
Container/roll-on/roll-off	1	0	1	1	0	1
Roll-on/roll-off	16	0	0	1	0	15
Passengership	3	0	0	0	0	3
Subtotal	227	33	1	52	28	181
Ready Reserve Fleet (RRF)						
Victory	1	0	0	1	0	0
Freighter/partial containership	24	0	21	2	0	43
Container/roll-on/roll-off	2	0	0	0	0	2
Containership (TACS) c/	0	0	11	0	0	11
Seatrain	5	0	0	0	0	5
Subtotal	32	0	32	3	0	61
National Defense Reserve Fleet (NDRF)						
Victory	129	0	1	0	0	130
Freighter/partial containership	4	0	17	2	1	18
Non-self-sustaining containership	4	0	4	3	1	4
Self-sustaining containership	3	0	0	2	1	0
Seatrain	4	0	0	0	4	0
LST (landing ship tank)	10	0	0	0	0	10
Troopship/schoolship	17	0	0	1	0	16
Subtotal	171	0	22	8 d/	7	178

(Continued)

TABLE A-8. (Continued)

Fleet	1983	New Builds	Transfers b/ In	Transfers b/ Out	Scrap	1988
Dry Cargo Fleet (Continued)						
Navy-owned e/						
Freighter	2	0	0	0	0	2
Non-self-sustaining containership (TAKR)	6	0	2	0	0	8
Roll-on/roll-off	2	0	0	0	0	2
Total	10	0	2	0	0	12
Military Sealift Command (MSC)-chartered e/						
Freighter/partia; containership	19	0	0	4	2	13
Container/roll-on/roll-off	1	0	1	0	0	2
Roll-on/Roll-off (including TAKR)	5	8	5 f/	0	0	18
Barge carrier	2	0	1	0	0	3
Subtotal	27	8	7	4	2	36
Total, Dry Cargo	467	41	64	67	37	468
Tanker Fleet g/						
Commercial	143	14	9	39	37	100
RRF 0	0	16	0	0	16	
NDRF 14	0	28	0	14	28	
Navy-owned	5	0	0	5	0	0
MSC-chartered	25	7	0	6	3	23
Total, Tanker	187	21	63	50	54	167

SOURCE: Office of the Assistant Secretary of the Navy (Shipbuilding and Logistics).

a. As used in Department of Defense, Sealift Study (1984).
b. Transfers in and out of active and reserve fleets.
c. Up to 11 have been identified for use as crane ships (TACS). The fiscal year 1984-1988 Five Year Defense Plan funds only six; the remaining five are shown as containerships in the data base.
d. Three ships to be transferred from MarAd to MSC for fleet ballistic missile carriers and one troopships for use as berthing ships.
e. Carried under MSC fleet.
f. Five foreign-flag roll-on/roll-off chartered by MSC.
g. Includes coated tankers between 6,000 and 80,000 deadweight tons.

TABLE A-9. COMMERCIAL SHIP CONSTRUCTION IN U.S. SHIPYARDS AS OF JANUARY 1, 1984 a/

Shipyard	Owner	Type b/	Number	Total DWT	Cost c/	Government Participation	Scheduled Delivery Date
Avondale Shipyards, Inc. New Orleans, La.	Exxon	Tanker (d)	2 d/	85,000	170.0	None	1983-84
Bath Iron Works Corp., Bath, Maine	Falcon I Sea Transport	Tanker	1 d/	40,000	71.0	CDS (49.98%), mortgage guarantee	1983-84
Bethelehem Steel Corp., Sparrows Point, Md.	4th, 5th, TB Corp.	Tugbarge e/	2 d/	94,000	143.6	Mortgage guarantee	1983-84
Tacoma Boatbuilding Co., Tacoma, Wash.	Apollo Co.	Incinerator f/	2 d/	14,400	74.6	Mortgage guarantee	1984
Twin City Shipyard, Inc., St. Paul, Minn.	Gulf Coast Trailing	Dredge	1	4,800	25.5	Mortgage guarantee	1985
American Shipbuilding Co., Tampa, Fla.	Ocean Carriers	Tanker	5	150,000	288.6	None	1985-86
Total			13	388,200	773.3		

SOURCE: U.S. Maritime Administration.

a. In commercial shipyards with facilities to build vessels 475 by 68 feet.
b. All diesel propulsion.
c. In millions of dollars, estimated.
d. Keel has been laid.
e. Integrated tug barges. Tugs being built by Halter Marine.
f. Burns hazardous wastes at sea.

TABLE A-10. CARRIAGE OF U.S. OCEANBORNE FOREIGN TRADE IN 1983

Oceanborne Foreign Trade	By Weight (In millions of tons)	By Value (In billions of dollars)
Total, U.S. Trade	629.2	267.5
U.S.-Flag	36.7	43.4
U.S. Percent of Total	5.8	16.2
Total, Liner Trade a/	51.3	139.7
U.S.-Flag, Liner	14.1	37.9
U.S. Percent, Liner	24.5	27.1
Total, Nonliner Trade a/	316.9	69.9
U.S.-Flag, Nonliner	4.7	1.5
U.S. Percent, Nonliner	1.5	2.1
Total, Tanker Trade	255.0	57.9
U.S.-Flag, Tanker	17.9	4.0
U.S. Percent, Tanker	7.0	6.8

SOURCE: U.S. Maritime Administration.

a. Liners are ships that operate as common carriers on regularly scheduled routes. Nonliners are all other dry-cargo ships, largely bulk carriers, that carry cargo on charter hire with irregular schedules.

APPENDIX B. MARITIME INDUSTRY SUBSIDIES AND THE U.S. ECONOMY

The Merchant Marine Act of 1936 established two kinds of direct subsidy payments for the promotion and support of the U.S. maritime industries:

- Construction differential subsidy (CDS) for the support of merchant ship construction in U.S. shipyards, and
- Operating differential subsidy (ODS) for the support of U.S. ship operators.

Construction differential subsidy payments are intended to compensate the ship buyer for the additional expense of ordering a ship from a U.S. shipbuilder rather than ordering the same ship from a foreign builder at a lower cost. Such payments can be made only to U.S. citizens who will operate the ship under U.S. registry in the carriage of foreign trade. The maximum CDS payment is limited to no more than 50 percent of the cost of the ship. Since the program was started, CDS payments, together with reconstruction subsidies, have totaled over $3.5 billion.

The operating differential subsidy is a payment made by the government to a ship operator who has contracted with the government to provide shipping services on certain specified essential trade routes. The ODS recipient must be a U.S. company (majority ownership by U.S. citizens) and must provide this service with ships built in the United States, manned by U.S. citizens, and registered in the United States. The amount of the payment is determined by the Maritime Administration and is intended to make up the difference between the operating costs of a U.S.-flag ship with an American crew and the foreign-flag competition. Since the program was established, ODS payments have totaled over $6 billion. Table B-1 shows a historical record of ODS and CDS outlays

The Reagan Administration has discontinued the CDS program; the last contracts were written in fiscal year 1981. While no new ODS contracts are being written, existing contracts are, of course, being honored.

Advocates of various subsidies contend that such subsidies are not really a cost to the government in that the economic activity stimulated by

TABLE B-1. MARITIME SUBSIDY OUTLAYS, FISCAL YEARS 1936-1982 (In dollars)

Fiscal Year	CDS	Reconstruction Subsidy	Total CDS and Recon. Subsidy	ODS	Total ODS and CDS
1936-1955	248,320,942 a/	3,286,888	251,607,830	341,109,987	592,717,817
1956-1960	129,806,005	34,881,409	164,687,414	644,115,146	808,802,560
1961	100,145,654	1,215,432	101,361,086	644,115,146	808,802,560
1962	134,552,647	4,160,591	138,713,238	181,918,756	320,631,994
1963	89,235,895	4,181,314	93,417,209	220,676,685	314,093,894
1964	76,608,323	1,665,087	78,273,410	203,036,884	281,310,254
1965	86,096,872	38,138	86,135,010	213,334,409	299,469,419
1966	69,446,510	2,571,566	72,018,076	186,628,357	358,646,433
1967	80,155,452	932,144	81,08,566	175,631,860	256,719,426
1968	95,989,586	96,707	96,086,293	200,129,670	296,215,963
1969	93,952,849	57,329	94,010,178	194,702,569	288,712,747
1970	73,528,904	21,734,343	95,252,247	205,731,711	300,983,958
1971	107,637,353	27,450,968	135,088,321	268,021,097	403,109,418
1972	111,950,430	29,738,076	141,698,479	235,666,830	377,365,310
1973	168,183,937	17,384,604	185,568,541	226,710,926	412,279,427
1974	185,060,501	13,844,951	198,905,452	257,919,080	456,824,532
1975	237,895,092	1,900,571	239,795,663	243,152,340	482,948,003
1976 b/	233,836,424	9,886,034	243,712,448	386,433,994	630,146,442
1977	203,479,571	15,052,072	218,531,643	343,875,521	562,407,164
1978	148,690,842	7,318,705	156,009,547	303,193,575	459,203,122
1979	198,518,437	2,258,492	200,776,929	300,521,683	501,298,612
1980	262,727,122	2,352,744	265,079,866	341,368,236	606,448,102
1981	196,446,214	11,666,978	208,113,192	334,853,670	542,966,862
1982	140,774,519	43,710,698	184,485,217	400,689,713	585,174,930
Total	3,473,030,054	257,384,801	3,730,414,855	6,559,565,235	10,289,980,090

SOURCE: U.S. Department of Transportation, U.S. Maritime Administration, U.S. Maritime Administration 1982 Annual Report (February 1984), p. 55.

a. Includes $131.5 million CDS adjustments covering the World War II period, $105.8 million equivalent to CDS allowances that were made in connection with the Mariner Ship Construction Program, and $10.8 million for CDS in fiscal years 1954 to 1955.

b. Includes totals for fiscal year 1976 and the Transition Quarter ending September 30, 1976.

the subsidies generate sufficient employment, income, and additional tax revenues to recover more than the subsidy outlays.

Several recent studies have attempted to estimate such effects for the maritime industry subsidy programs. Summary results of two such studies are displayed in Table B-2 for CDS and ODS. Using an input-output model methodology, the studies assessed the additional output and personal income generated in the economy as well as the value added to the gross national product (GNP), additional employment, and tax revenues resulting from the stimulation of the subsidies. The study by the Port Authority of New York and New Jersey covered 1970 and the Chung study covered the 1971-1978 period. Both studies indicate substantial economic stimulation as a result of the subsidies.

Many economists challenge, however, the imputation of such benefits from subsidies. They argue that the alleged benefits must be compared with still greater benefits that might have accrued if the same stimulus had been provided in other industries in which the United States enjoys a greater comparative advantage. In their view the true cost of the subsidies is the difference in the total economic benefits between an optimal alternative use of the subsidy resources, which market forces might have brought about, and the lesser benefits of directed subsidy. Economists who hold this view feel that the cost may be much larger than the amount of the subsidy.

TABLE B-2. ECONOMIC IMPACT OF DIRECT SUBSIDIES
(In millions of dollars)

Subsidy and Direct and Indirect Effects	Port Authority of New York and New Jersey 1970 Estimates (In 1970 dollars)	H.C. Chung University of Bridgeport 1971-1978 (In 1972 dollars)
Construction Differential Subsidies		
Subsidy	115.2	1,400
Effect		
Output	552.6	5,700
Personal income	181.5	2,400
Value added to GNP	244.9	2,900
Employment	21,700	211,000
Tax revenues	34.5	Not Estimated
Operating Differential Subsidies		
Subsidy	234.8	1,900
Effect		
Output	1,905.2	23,200
Personal income	671.7	6,200
Value added to GNP	895.4	8,100
Employment	66,800	570,000
Tax revenues	126.1	Not Estimated

SOURCES: Prepared for the U.S. Department of Commerce, Maritime Administration, Port Authority of New York and New Jersey Planning and Development Department, Economic Impact of the U.S. Merchant Marine and Shipbuilding Industries, An Input-Output Analysis (May 1977).

H.C. Chung, Economic Impact of Maritime Industries on the U.S. Economy, 1971-1978, An Interindustry Analysis, prepared for the U.S. Department of Commerce, Maritime Administration (University of Bridgeport, January 1981).

APPENDIX C. SUMMARY DESCRIPTION OF MARITIME SUPPORTS PROVIDED BY U.S. LAW

The following summary of U.S. support programs for the maritime industries is reprinted from the Maritime Administration publication, Maritime Subsidies, February 1983.

Operating Subsidy

Operating-differential subsidy is granted to United States ship operators to place U.S.-flag vessels' operating costs on a parity with those of foreign competitors. Subsidy is based on the difference between the fair and reasonable cost of insurance, (protection and indemnity, and hull and machinery premiums), maintenance, repairs not compensated by insurance, wages of officers and crews, and subsistence of officers and crews on passenger vessels, and the estimated costs of the same items if the vessels were operated under foreign registry.

Subsidy is paid pursuant to operating subsidy contracts between the government and the operators. Authority for the payment of subsidy under these contracts is contained in Title VI of the Merchant Marine Act, 1936, as amended. In accordance with government/industry efforts to reduce government expenditures on privately owned merchant shipping, the most recently executed operating subsidy contracts have not included subsidy for hull and machinery insurance premiums,* and maintenance and repair costs, pursuant to the provisions of section 603 of the Act which permit the parties to the operating subsidy contracts to agree to a lesser amount of subsidy than that which is necessary to achieve parity.

Under Title VI, the operators holding subsidy contracts must be United States citizens and must possess certain other qualifications, the Secretary of Transportation must determine that the subsidized vessels are of United States construction or were constructed in accordance with section 615 of the Act, which permits foreign construction within a defined time frame,

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* In some instances, protection and indemnity insurance premiums and deductible are not included.

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and that the operation of such vessels in an essential service is required to meet foreign-flag competition and to promote the foreign commerce to the United States. Under certain circumstances, as to passenger vessels, in addition to the liner trades, operating subsidy is also authorized for the cruise trades. In respect to cargo vessels, prior to the enactment of the Merchant Marine Act of 1970 which extensively amended the 1936 Act, operating subsidy was payable only to liner type vessels with scheduled sailings on established trade routes. The 1970 amendments broadened the scope of the term essential service to authorize the payment of operating subsidy to aid in the operation of bulk carrier type vessels, whether or not operating on particular services, routes, or lines. Also, Public Law 91-603 enacted December 31, 1970, which further amended Title VI of the 1936 Act, permits the payment of operating subsidy on leased as well as owned vessels.

The subsidized operators under the operating-differential subsidy contracts must assume the obligations of a replacement program under which they are contractually required to construct new vessels to replace the existing vessels in their subsidized fleets as the existing vessels become obsolete. The number of vessels to be built under the replacement program and the vessels' designs are agreed upon after negotiations between the subsidized ship operators and the United States Government.

The total amount of subsidy paid under the operating-differential subsidy contracts during fiscal year 1982 was $401 million.

Construction Subsidy

Under the provisions of Title V of the Merchant Marine Act, 1936, as amended, provision is made for a construction-differential subsidy to build vessels to be used in the foreign commerce of the United States. The purpose of the subsidy is to enable United States shipyards to construct vessels in the United States on a parity with their foreign competitors, and thus enable U.S. ship purchasers to obtain U.S.-built vessels at competitive world prices.

The Merchant Marine Act, 1936, was further amended by a public law enacted July 31, 1976, which provides that, for construction contracts which are executed on a negotiated basis, as well as for those executed on a bid basis, the vessels being constructed under Title V may be aided by construction subsidy up to a rate of 50 percent of the domestic cost of the vessel.

A shipyard of the United States or Puerto Rico or a proposed purchaser who meets the qualifications set forth in the Merchant Marine Act, 1936, as amended, may apply for construction subsidy to aid in the construction or reconstruction of a vessel which will meet the requirements of the

foreign commerce of the United States and will aid in the promotion and development of such commerce, and which will be suitable for use for military purposes in time of national emergency. Regardless of whether the shipyard or purchaser is the applicant, the construction subsidy is paid to the shipyard. Vessels built with the aid of construction subsidy must be manned by U.S. citizen crews, and must remain documented under the laws of the United States for not less than 25 years, except with respect to tankers and other liquid bulk carriers which must remain so documented for not less than 20 years.

The combined costs on the vessels which were under CDS contracts for construction or reconstruction on September 30, 1982 totalled $717.9 million, of which $349.1 million will be paid by the government.

There is no construction subsidy for vessels operating in the domestic trade.

On August 13, 1981, the Omnibus Budget Reconciliation Act (Reconciliation Act) was enacted. Due to the budget omission of new construction-differential subsidy (CDS) funding in fiscal year 1982 and the possibility that funding may be at relatively low levels in succeeding years, Section 1610 of the Reconciliation Act amended the Merchant Marine Act of 1936 by adding a section 615. Section 615 provides a temporary means whereby the Secretary of Transportation (Secretary) may authorize an operator receiving or applying for operating-differential subsidy to construct, reconstruct, or acquire its vessels in a foreign shipyard if the Secretary finds and certifies in writing that such operator's application for CDS cannot be approved due to the unavailability of funds in the CDS account.

Section 615 provided that foreign construction authorizations could be extended through fiscal year 1983 only if the President requests at least $100 million in CDS funds for that year or proposes an alternate program that would create equivalent merchant shipbuilding activity in privately owned U.S. shipyards. To date, this requirement has not been met.

Tax Benefits

In general, shipping is treated similarly to other industries, except that United States citizens owning or leasing eligible vessels may obtain certain tax benefits through the maintenance of Capital Construction Funds and Construction Reserve Funds to construct qualified vessels.

The Capital Construction Fund (CCF) program is a method of aiding United States vessel operators in accumulating capital necessary for the construction, reconstruction, and acquisition of vessels of United States re-

gistry built in the United States. The purpose of the program is to remove certain competitive disadvantages that U.S. operators have relative to foreign-flag operators. The CCF extends tax deferral privileges to vessel operators in the U.S. foreign commerce and in the non-contiguous and Great Lakes domestic trades.

The CCF program is authorized by section 607 of the Merchant Marine Act, 1936, as amended, and arose from the 1970 amendments to the Act. Prior to 1970 only subsidized operators had tax deferred funds, referred to as Capital Reserve Funds, under section 607. The revised CCF program under section 607 is available to both subsidized and non-subsidized operators, and the old Capital Reserve Funds have been phased out of existence.

Section 607 allows for the deferment of income taxes on certain deposits of money or other property, if the funds are used to construct vessels in U.S. shipyards. An operator may deposit earnings or gains realized from the sale or other disposition of an agreement vessel; net proceeds realized from the sale or other disposition of an agreement vessel; and earnings from the investment or reinvestment of amounts on deposit in the fund. In general, the taxable income of the operator is reduced to the extent deposits of money are made into the fund under these ceilings.

An operator may also deposit in a CCF amounts allowable as a depreciation deduction with respect to agreement vessels. Such deposits do not directly reduce taxable income, but the earnings from such funds may be accumulated on a tax deferred basis.

By the investment of the assets in the CCF, a fundholder may compound the fund benefits and develop an expanded pool of tax deferred funds. However, the investment of the fund in securities and stocks is subject to certain restrictions which are intended to preserve the integrity of the fund.

A fund established pursuant to section 607 is maintained in three accounts: an ordinary income account, a capital gain account, and a capital account. The manner in which the funds would be taxed if not desposited is the primary determinant of the account to which a deposit is credited. When qualified withdrawals are made from the fund for the construction, reconstruction or acquisition of vessels, barges or containers, certain basic adjustments are made to the assets being acquired depending upon the account from which the monies are withdrawn. Withdrawals from the capital gain account result in a partial reduction of basis, and withdrawals from the capital account do not reduce the basis of the vessel.

If a withdrawal is made from the fund for other than a qualified purpose, any amounts withdrawn from the ordinary income and capital gains

accounts are taxable as if earned in the year of withdrawal. Additionally, the tax attributable to the non-qualified withdrawal is subject to an interest charge for the period between the year the amount was deposited and the year the withdrawal is made. Since the tax is paid on non-qualified withdrawals, no adjustments to bases arise as a result of a non-qualified withdrawal.

The Construction Reserve Fund (CRF) authorized by section 511 of the Merchant Marine Act, 1936, as amended, is also a financial assistance program which provides tax deferral benefits to United States shipowners. Through the CRF shipowners operating vessels in the foreign or domestic commerce of the United States can defer the gain attributable to the sale or loss of a vessel. The proceeds deposited must be used to construct, reconstruct, or acquire vessels of United States registry built in the United States. Although any gains on such transactions are not recognized for income tax purposes if the deposits are properly expended for a vessel, the basis for determining depreciation of such a vessel are reduced by the amount of any such gains.

The ability to defer gain on certain transactions through deposits to the CRF applies only to vessel owners. Citizens operating a vessel owned by another party cannot benefit from the provisions relating to the non-recognition of gain from the sale or loss of a vessel.

Section 511 also permits a vessel's owner or operator to deposit into the CRF earnings from the operation of United States registry vessels and earnings from the investment of the fund. Such deposits do not exempt the taxpayer from tax liability on the earnings nor do they postpone the time such earnings are includable in gross income. However, earnings so deposited are considered to have been accumulated for the reasonable needs of business and are not subject to accumulated earnings tax. This ability to accumulate funds for the construction, reconstruction, or acquisition of a vessel is the only benefit available through the CRF to a non-owner operator of a vessel.

Loans and Interest on Loans

Pursuant to Title XI of the Act, the Maritime Administration is authorized to guarantee obligations (including notes, bonds and bank loans) to aid in financing the construction or reconstruction of vessels designed principally for research, or for use in the domestic or foreign commerce of the United States. The shipowner, managing agent, and bareboat charterer are required to be U.S. citizens. In the opinion of the United States, the shipowner and/or bareboat charterer must possess the qualifications necessary

for the adequate operation of the mortgaged property and the proposed project must be economically sound.

Obligations during the construction period can be issued on a short or long-term basis with the short-term obligations usually converted to long-term obligations upon maturity. At delivery, a mortgage is then placed on the vessel in favor of the Secretary if guarantees were issued during the construction period. If there is no guarantee during the construction period, a mortgage is placed on the vessel at the time the guaranteed obligations are issued. In certain instances a guarantee may be placed on an unencumbered existing vessel to pay for the construction cost of a new vessel.

Vessels eligible for guarantees under Title XI, of design satisfactory to the United States, include passenger, cargo and fishing vessels, tankers, towboats, dredges, barges, floating drydocks, oceanographic research or instruction or pollution treatment, abatement or control vessels.

Guarantees on the obligations are eligible to be granted up to 75 percent or to 87½ percent of the vessel's cost, depending on the type of vessel being constructed or reconstructed. Ships being built with the aid of construction subsidy may also be eligible for a Title XI guarantee up to 75 percent of the construction cost of the vessel to the shipowner.

Public Law 90-341 authorizes interest at rates not to exceed such percent annually on the principal obligations outstanding as the Secretary of Transportation determines to be reasonable taking into account private market conditions and the risks of the government.

The purpose of Title XI is to foster private rather than direct government financing of vessel construction and reconstruction.

As of September 30, 1982, Title XI guarantees in force and commitments outstanding amounted to nearly $8.1 billion.

Other

Section 510 of the Act authorizes the Maritime Administration to acquire privately owned obsolete vessels in exchange for an allowance of credit payable to the shipowner or shipbuilder on the construction of new vessels and also to acquire mariner class vessels constructed under Title VII of the Merchant Marine Act, 1936, and Public Law 911, Eighty-first Congress, and other suitable vessels, constructed in the U.S., which have never been under foreign documentation, in exchange for obsolete vessels in the National Defense Reserve Fleet.

Under sections 510 and 509, national defense features which are paid for entirely by the government are included in vessels under construction. If a vessel is built with construction subsidy, such payments are not considered part of the subsidy. Some of these national defense features are:

- o Nuclear, biological, and chemical washdown facilities.
- o Limited fueling-at-sea and high-line transfer installations.
- o Use of shock resistant materials.
- o Provide additional communications equipment.
- o Provide night convoy equipment.
- o Reinforce decks and inner bottoms and provide tie down fittings.
- o Provide for carrying 20 foot containers.
- o Increase crane capability.
- o Provide cargo oil piping coatings.
- o Provide for additional transient personnel.

Certain types of government-owned or financed cargoes are preferentially routed via U.S.-flag commercial vessels. 1/ In some of the govern-

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1. The various statutes under which these cargoes move are:

1. The 1904 Act which gives U.S.-flag ships preference in the transportation of supplies for the armed services in direct overseas support of the U.S. military establishment.

2. Public Law 664, enacted in 1954, which is included in the revised 1936 Act. This Act stipulates that at least 50 percent of all government generated cargo must be carried on U.S.-flag ships to the extent of their availability at fair and reasonable rates.

3. Public Resolution No. 17, enacted in 1034 applies to Ex-Im Bank loans for the exportation of goods from the United States and provides for their carriage exclusively in U.S.-flag ships except when waivers are granted by the Maritime Administration, as provided in the Resolution.

ment-aid programs the sponsoring agency assumes the additional cost of U.S.-flag freight over those for foreign flags. For example, under Title I of Public Law 480, the Department of Agriculture finances, with dollars, the ocean freight differential for U.S.-flag vessels required to be used. The foreign governments finance in U.S. dollars that portion of the ocean freight equal to the world market rate.

Section 714 of the Act provides that if the Secretary of Transportation shall find that any essential trade route cannot be otherwise successfully developed and maintaned, he may have ships built to be chartered to American-flag operators at not less than four percent per annum of the estimated foreign cost of such ships, plus an annual percentage of the depreciated foreign cost of the Treasury, plus an allowance for administrative costs. Such charters may contain an option to purchase such ships within five years from date of delivery under the charter at the estimated depreciated foreign cost. There are no moneys appropriated to build ships for this purpose.

APPENDIX D. U.S. MILITARY SEALIFT RESOURCES

The military sealift resources of the United States include the privately owned merchant fleet, the controlled fleet of the Military Sealift Command (MSC), and the National Defense Reserve Fleet (NDRF), with its Ready Reserve Fleet (RRF) component. 1/ Collectively, these resources might be inadequate to meet planned deployment and resupply schedules at the start of a NATO-Warsaw Pact war, but arrangements have been made for European NATO shipping assistance to make up any shortfall.

The Effective U.S. Control (EUSC) fleet of U.S.-owned ships under Panamanian, Liberian, Honduran, and Bahamian registry contains very few ships useful for military sealift. Of its dry cargo ships, only two, which are Lighter Aboard Ship (LASH) types, would be of any appreciable use in military deployment and resupply. The others are generally small, slow coasters and refrigerated ships with little or no military utility. Of its 39 million deadweight ton (dwt) tanker fleet, only 2 million dwt are product carriers suitable for military support, and even these are considered secondary to the larger and more dependable U.S.-flag product tanker fleet. Its 6.6 million dwt of dry bulkers have no military use.

In addition to serving as the country's predominant source of military sealift, the merchant marine can also augment, as necessary, the Navy's auxiliary force of 100 plus government-owned fleet support ships.

MILITARY SEALIFT

The Military Sealift Command controlled fleet of government-owned and chartered vessels includes 38 dry cargo ships and 27 tankers. Not all of these ships would be immediately available to support contingency operations, however, because some would be needed to support deployed overseas forces.

The NDRF ships, including the RRF component, are maintained under dehumidification at the three NDRF sites: James River, Virginia; Beaumont, Texas; and Suisun Bay, California. The RRF ships are scheduled for activation within five to ten days after mobilization, and have been success-

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1. This appendix is based on information provided by the U.S. Maritime Administration.

fully activated within this time frame in a series of activation tests. The rest of the NDRF sealift ships would be activated during 30 to 90 days after mobilization. The 130 Victory ships in the NDRF are old and slow, but are in passable condition, having been operated for only about seven of their 37 years, and they are well configured for some resupply missions, particularly ammunition. To replace their capability would be costly, and funds have not been made available.

The U.S. merchant fleet of dry cargo ships includes roll on/roll off ships, barge carriers, and breakbulk ships, all considered particularly desirable for deployment and resupply, plus containerships. Some of these ships might be withheld to support the domestic economy and military forces in theaters unaffected by the mobilization emergency. At present, the containerships are useful primarily for resupply, but current Navy programs plan to adapt them for the movement of wheeled and tracked vehicles and to provide for expeditionary offloading facilities to be used where shoreside port facilities are unavailable.

Since U.S.-flag assets might not be adequate for the required rapid deployment of U.S. forces to Europe in a NATO emergency, arrangements have been made for the augmentation of U.S. sealift assets by some 400 European-flag ships in the early stages of a NATO mobilization. To assure the availability of the these 400 ships, NATO allies have earmarked some 600 vessels, lists of which are maintained by MarAd and continuously updated. This commitment by the NATO allies covers only dry cargo ships. No tanker commitment has been sought.

The active U.S.-flag fleet contains some 229 tankers, aggregating about 13 million dwt. For wartime petroleum product (POL) movement, up to 97 coated product tankers, totaling about 3.9 million dwt, could be used for military support, leaving a tanker fleet of 132 ships of 9 million dwt to meet essential domestic trade requirements. As in peacetime, the economy would be heavily dependent on foreign-flag tankers to move oil imports. There are 56 product tankers in the EUSC fleet, totaling about 2 million dwt, that could be used for the early movement of military POL if they were available. They would serve primarily for early lifts in areas in which no U.S.-flag product carriers were positioned and to replace tankers lost to enemy action. If, as might happen, some foreign crews refused to sail EUSC ships in dangerous waters, it would be necessary to replace them with U.S. citizen crews, delaying their availability.

MANNING

The NDRF and its RRF segment would be operated under General Agency Agreements by private operators, and manned by crews drawn from

the union hiring halls. As the number of active ships in the U.S. merchant fleet has declined in recent years, the ratio of actively sailing merchant seamen to billets on active ships has increased progressively until it now equals 2.4:1. Thus, in excess of 20,000 seamen are ashore at any time, a number more than double the number required to crew all the sealift ships in the NDRF, plus the naval auxiliaries that are maintained in the NDRF for the Navy. Based on extensive discussions of NDRF manning with maritime labor representatives, the Maritime Administration (MarAd) anticipates no significant problems in manning the reserve fleet ships in time of emergency.

EMERGENCY MECHANISMS

Under mobilization conditions, the merchant fleet would be requisitioned under the terms of Section 902(a) of the Merchant Marine Act of 1936, as amended, and operated by the National Shipping Authority (NSA).

MarAd would bring the NSA into full operation at the outset of a defense-related emergency. In addition to a classified alternate site, MarAd maintains an emergency operations center at its headquarters for use in nonnuclear situations. Emergency procedures are routinely tested through MarAd participation in both civilian and military command post exercises (CPXs), which number three or four a year, and have included NIFTY NUGGET and PROUD SPIRIT, among publicized CPXs.

For use in nonmobilization contingencies, MSC maintains the Sealift Rediness Program (SRP), which provides a vehicle for acquiring ships and which, unlike the Section 902(a) requisitioning authority, does not depend on Presidential actions. Under the SRP, ships that receive subsidies, plus half the ships of nonsubsidized operators who carry peacetime Department of Defense cargo, are committed by contract to emergency call-up, subject to approval by the Secretaries of Defense and Transportation. MSC maintains the mechanism for SRP call-up. Like the MarAd NSA mechanism noted above, this procedure is tested routinely in CPXs.

APPENDIX E. ESTIMATED COST OF CARGO PREFERENCE

The U.S. merchant marine currently benefits from several cargo preference laws. The most important of these is the "Jones Act" that reserves all maritime traffic between U.S. ports to U.S.-flag ships. Other laws reserve all military cargo and 50 percent of government-impelled civilian cargo to ships built in American shipyards and owned and operated by American citizens. Over the years, proposals have been made to extend cargo preference restrictions to private, international trade as well. The most recent of these proposals, H.R. 1242 (termed the Boggs bill after the bill's chief sponsor), would require U.S.-flag ships to carry 20 percent of U.S. bulk maritime trade. This restriction would be phased in over a 16-year period. Since American owned and operated bulk carriers now account for only some two percent of U.S. bulk traffic, the Boggs bill would provide a powerful economic stimulus to the American shipbuilding industry, to ship operators, and to their crews. It would also increase the costs to export or import bulk goods, thus decreasing the overall level of U.S. trade and imposing economic costs on some U.S. industries and consumers.

An estimate of the economic cost of this proposed legislation depends on several factors:

- The costs to build and operate U.S. vessels relative to foreign ships;
- Projected U.S. trade in bulk commodities; and
- The productivity with which these ships are used.

Some of these elements are more difficult to estimate than others. For example, there is little disagreement over Maritime Administration data that show the cost to build bulk carriers in U.S. shipyards is about two and one half to three times the cost in foreign yards. Operating costs are similarly two to three times as expensive, primarily because of the higher wages paid American seamen compared to European or Asian crews.

Trade projections for nearly 20 years in the future are naturally speculative since they depend on future commodity prices, economic growth, and foreign competition. Recent forecasts of the 20 percent of U.S. bulk trade that would be subject to the Boggs bill range from 167 million tons to 228 million tons in the year 2000 (see Table E-1).

TABLE E-1. COMPARISON OF PROJECTIONS FOR CARGO PREFERENCE, BY FORECASTING AGENCY a/

	Maritime Administration	Center for Naval Analysis	Federation of American Controlled Shipping
Projected Trade (In millions of tons)			
Coal	44.0	24.9	43.4
Other dry bulk	90.0	80.8	103.7
Petroleum	49.6	60.0	81.4
Total	183.6	166.7	228.5
Productivity (In tons of cargo per deadweight ton of ship capacity)	8.4	11.3	5.9
Ships			
Total deadweight tons (In thousands)	21,882	14,730	38,538
Average vessel size (In deadweight tons)	81,650	44,772	54,996
Number of ships	268	329	701

SOURCE: Congressional Budget Office.

a. Twenty percent of U.S. bulk cargo trade in the year 2,000; 1998 for Maritime Administration.

The most important single variable in estimating the costs of cargo preference is the productivity of the fleet. At present, the world bulk fleet averages about 4.3 tons of cargo carried per year per deadweight ton of ship capacity, down from five tons per deadweight ton in the mid 1970s. Over time, as the currently depressed shipping market recovers, an improvement to 6 to 8 tons per deadweight ton appears possible.

The cargo preference requirements called for by the Boggs bill would increase shipping costs by about $3 to $4 billion a year (in 1984 dollars) once

the full, 20 percent level was reached. This is based on estimates of ship construction and operating costs derived from the Maritime Administration, bulk traffic of about 180 million tons per year when the legislation became fully effective, and gross productivity of between 6 to 8 tons per deadweight ton. It also assumes a 15 percent reduction in the costs of ship construction and operation, as called for by the Boggs bill.

The economic effects of such an increase would vary considerably. The most serious adverse impact would probably be felt by U.S. coal producers, both because they face close competition in world markets and because the increase in shipping costs represents a relatively high portion of coal's delivered price. Agricultural exports would be affected somewhat less and petroleum imports relatively little. In total, the economic loss to these industries in terms of reduced production and fewer U.S. jobs would be significant, but no attempt has been made to estimate their magnitude.